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NTDS COMPUTER FACILITIES SCHEDULING SYSTEM--FINAL REPORT.(U)

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NAVAL POSTGRADUATE SCHOOL

Monterey, California

NTDS COMPUTER FACILITIES SCHEDULING SYSTEM

--FINAL REPORT

by

James K. Hartman

and

Gilbert T. Howard

December 1977

Prepared for:
FLTCOMDIRSYSSACT
San Diego, California

NAVAL POSTGRADUATE SCHOOL
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This report investigates the scheduling of Naval Tactical Data Systems (NTDS) mockups and the associated computer facilities at FCDSSA/FCDSTCP, San Diego. We provide a design for an automated, computer based, interactive system for assisting in the management of job and equipment scheduling, equipment status recording and equipment hookup. The decision logic of the scheduling portion of this system has been developed in detail, and a prototype scheduling program has been written and tested. The results indicate that the computer

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A schedule for system implementation is also suggested.

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ABSTRACT

This report investigates the scheduling of Naval Tactical Data Systems (NTDS) mockups and the associated computer facilities at FCDSSA/FCDSTCP, San Diego. We provide a design for an automated, computer based, interactive system for assisting in the management of job and equipment scheduling, equipment status recording and equipment hookup. The decision logic of the scheduling portion of this system has been developed in detail, and a prototype scheduling program has been written and tested. The results indicate that the computer program can do a good job of producing a job schedule and the associated equipment assignments.

A schedule for system implementation is also suggested.

I. INTRODUCTION

A. Purpose

This report investigates the scheduling of Naval Tactical Data System (NTDS) mockups and the associated computer facilities at the Fleet Combat Direction System Support Activity (FCDSSA) and the Fleet Combat Direction System Training Center, Pacific (FCDSTCP), San Diego. NTDS mockups, digital computers, and various items of computer peripheral equipment are combined into many different configurations for use in training by FCDSTCP and for use in program development and program test by FCDSSA. Equipment must also be made available periodically for required maintenance. The variety of different users, configurations, and time restrictions creates a problem in job and equipment scheduling which is quite complicated.

In this report we provide a design for an automated, computer based, interactive system for assisting in the management of job and equipment scheduling, equipment status recording, and equipment hookup for the NTDS computer facilities. Installation of such a system could relieve the load on the current manual scheduling system and provide continuity in the scheduling system even though the individuals responsible for scheduling may change. It could also make up to date schedule and equipment status information readily available, provide increased flexibility when schedule revisions are necessary, and interface with the high speed digital switch (HSDS) equipment leading eventually to automatic hookup of jobs.

B. Report Organization

Section II of this report provides an overview of system operation from the user's viewpoint and indicates from the system viewpoint how the automated functions are accomplished. In particular, this requires definition of data files for the scheduling system and program modules to operate upon these files as the system performs its various functions. These files and program modules are briefly described in Section II, and their interrelationships are specified.

Section III concentrates on file descriptions in greater detail.

Section IV provides detailed decision logic and flowcharts for the program modules which make up the system. In particular, the complex module which actually performs the scheduling operation is broken into several subroutines which are described in detail. A preliminary, non-interactive version of this scheduling module has been written and tested in order to assess the effectiveness of the scheduling logic. This program is described in Section V.

Finally, in Section VI we list what we feel are the major remaining tasks leading to implementation of the system.

II. SYSTEM OPERATION

A. General Overview

An overall view of the system is provided in the flowchart of Figure 1. System USERS input equipment configuration definitions and requests for scheduled time. MAINTENANCE personnel input equipment status updates. Once a week these inputs are integrated to form a schedule of time and equipment assignments at the CONTROL DESK by a human scheduler interacting with a scheduling program. When the time comes for jobs to be run, the CONTROL DESK initates the HSDS control program which references the configuration file and the schedule to determine which equipment to hookup. When changes are required in the schedule, the scheduling program is again called and the changes are worked out interactively by the scheduler and the program.

In the above overview we have designated three categories of people who will interact with the system.

1. USERS are people who submit job requests for scheduled time on various configurations of NTDS equipment. Note that this category includes job requests for training, program development and test, and also for scheduled maintenance.

2. The system CONTROL DESK is a central location with overall control of system operation. It includes the scheduling function as well as initiation of equipment hookup and some communications with users.

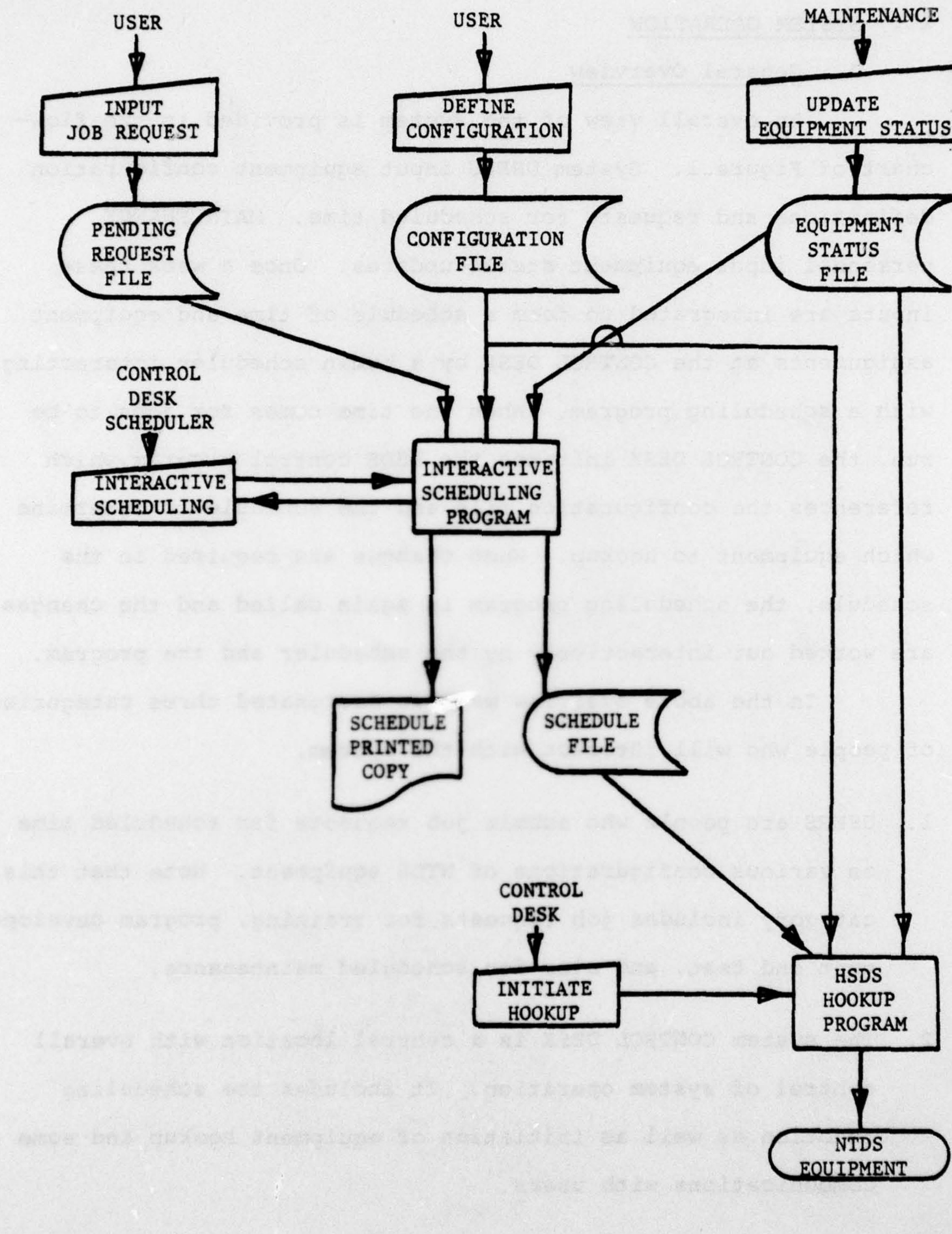

Figure 1. Overall System Operations

3. MAINTENANCE personnel interact with the system by updating equipment status indicators as equipment fails and is fixed.

B. Typical Interaction Sequences

Since the operations of this system are to some extent interactive and occur in a time sequence, it is useful to describe typical sequences of interactions within the context of a scheduling cycle. The system will produce a new schedule once a week. For convenience let us assume that this occurs on Wednesday afternoon each week and that the schedule produced starts at 0000 hours on the following Monday and runs for a week. (Alternate assumptions about timing would change details, but the overall pattern of interaction sequences would be similar.) For convenience we number the days in a three consecutive week period as follows:

M	T	W	H	F	A	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19

On Wednesday the 8th, the system will be constructing a schedule for the week 13-19.

1. Typical sequence for weekly scheduling. The following flowchart (Figure 2) summarizes the typical sequence of interactions for a user request to be included on next week's schedule. Such a request would be submitted anytime on days 1-7, would be scheduled on days 8-9, and would run during the week 13-19. The flowcharts in this section are based on a preliminary chart developed by LT Amos Maples, FCDSSA.

2. Typical sequence for daily scheduling. Sometimes a user will discover after the scheduling deadline (day 8) that he would like to have a job scheduled during the week 13-19. If there is available equipment to meet his late request, then his job should be added to the schedule, but in general the existing schedule will not be changed to accommodate the late request. We call such a request a "daily" request. The interaction sequence for a "daily" request is shown in the following flowchart (Figure 3).

3. Typical sequence for maintenance status change. Maintenance personnel will modify the equipment status file whenever a piece of equipment fails or is repaired. The impact on the scheduling system is shown in the accompanying flowchart (Figure 4).

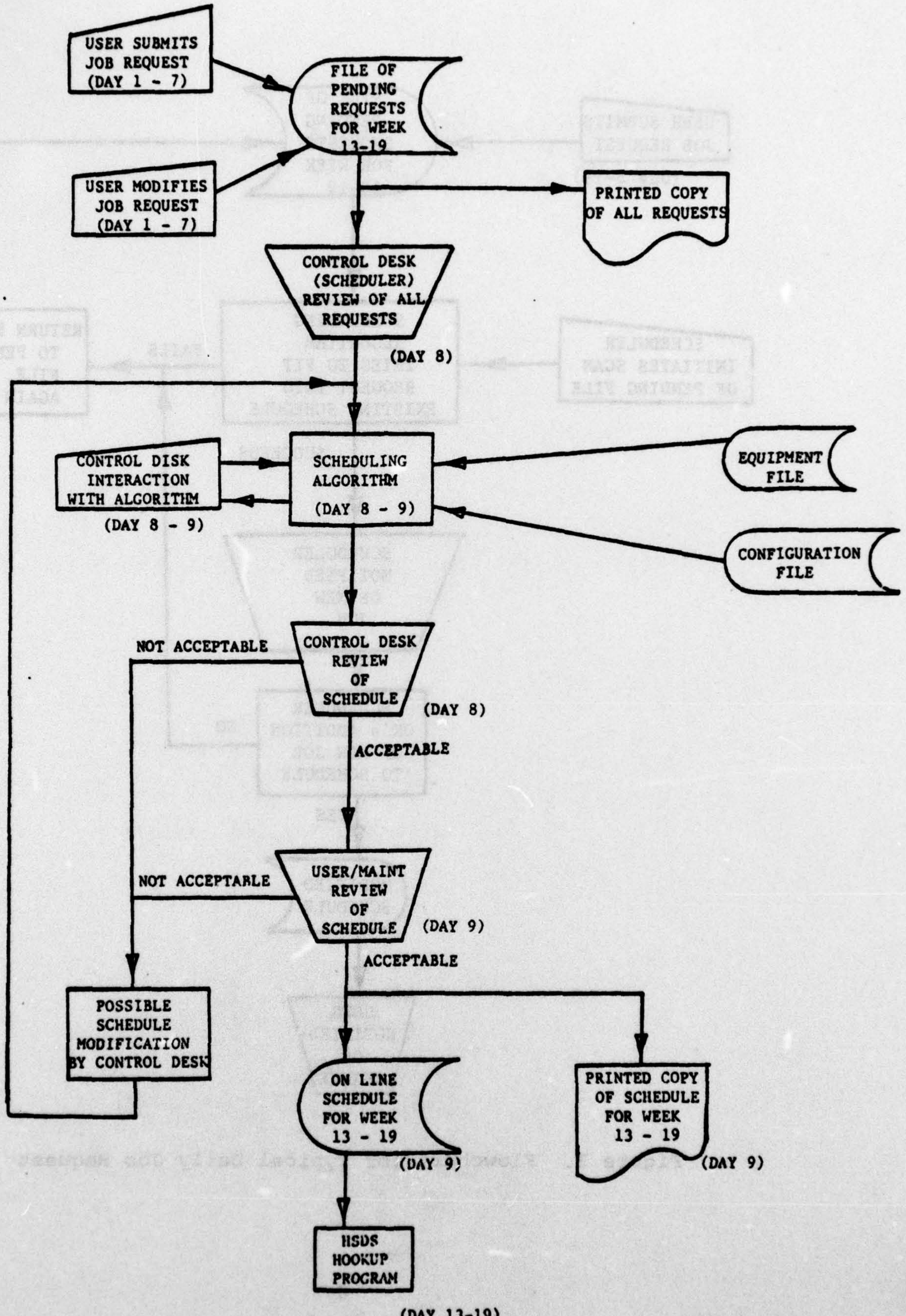

Figure 2. Flowchart for Typical Weekly Job Request

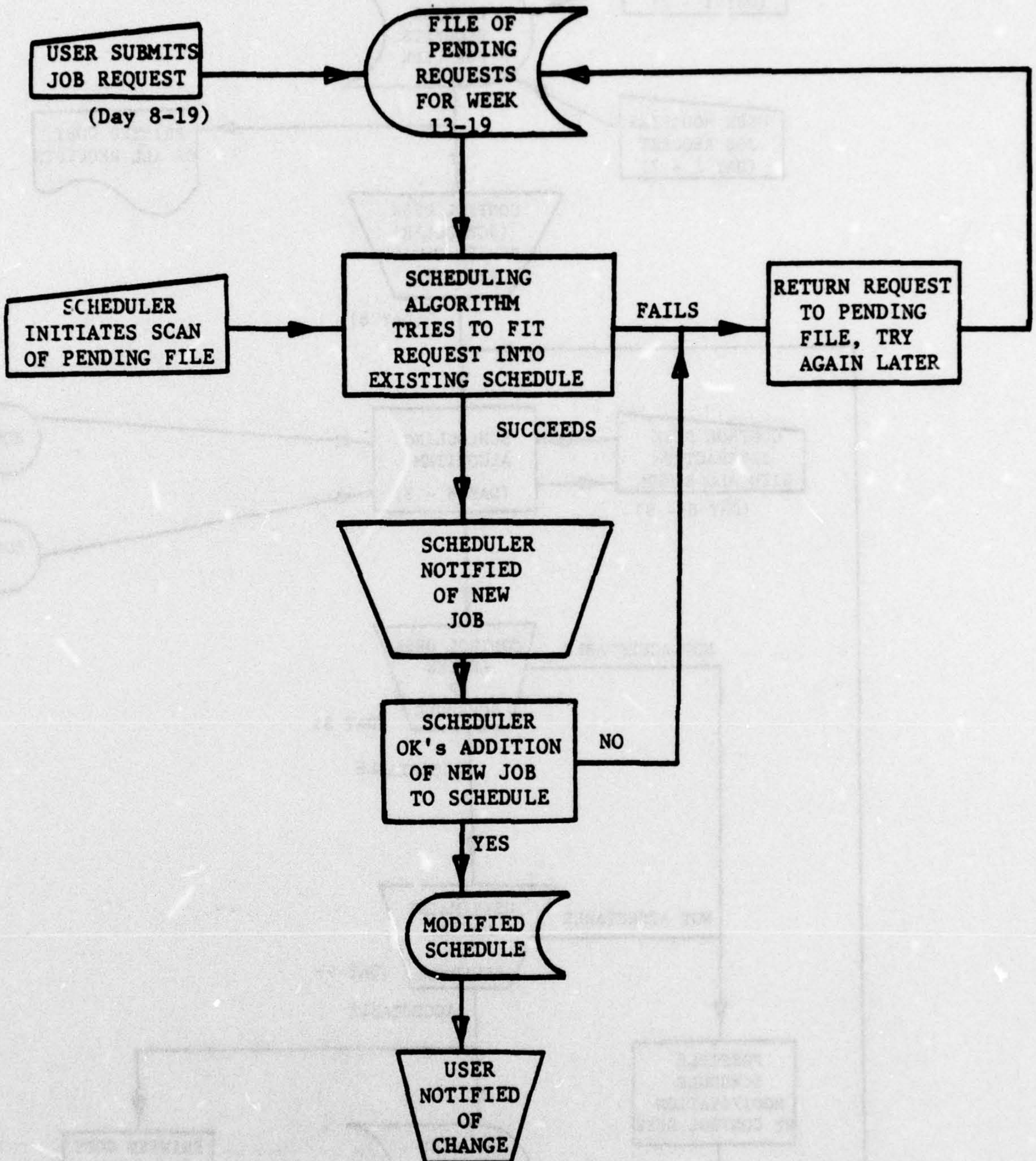

Figure 3. Flowchart for Typical Daily Job Request

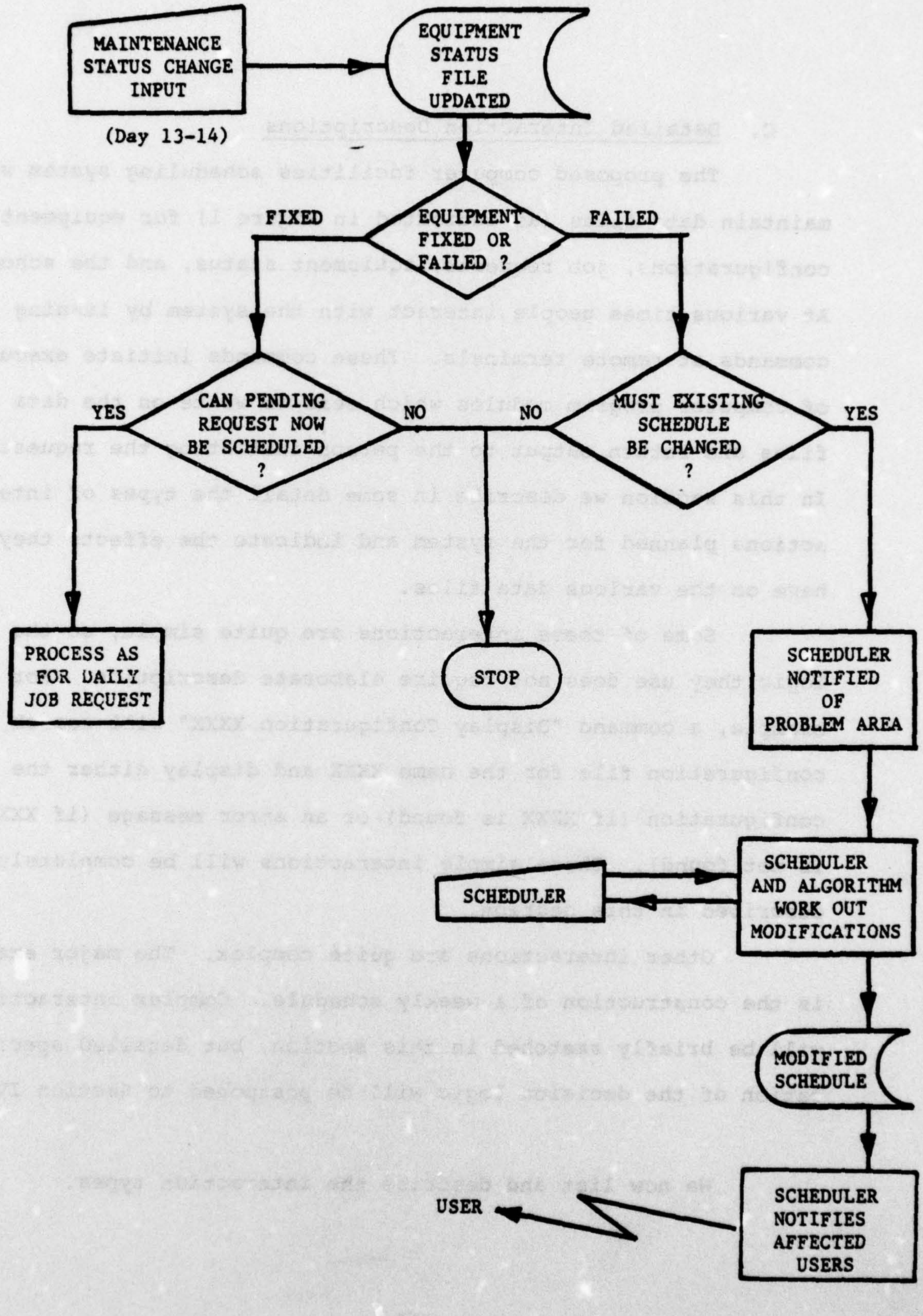

Figure 4. Flowchart for Maintenance Status Change

C. Detailed Interaction Descriptions

The proposed computer facilities scheduling system will maintain data files (as indicated in Figure 1) for equipment configurations, job requests, equipment status, and the schedule. At various times people interact with the system by issuing commands at remote terminals. These commands initiate execution of computer program modules which read or write on the data files and return output to the person initiating the request. In this section we describe in some detail the types of interactions planned for the system and indicate the effects they have on the various data files.

Some of these interactions are quite simple, so the logic they use does not require elaborate description. For example, a command "Display Configuration XXXX" will search the configuration file for the name XXXX and display either the configuration (if XXXX is found) or an error message (if XXXX is not found). These simple interactions will be completely described in this section.

Other interactions are quite complex. The major example is the construction of a weekly schedule. Complex interactions will be briefly sketched in this section, but detailed specification of the decision logic will be postponed to Section IV.

We now list and describe the interaction types.

1. Define Configuration. Each job request must specify the equipment it requires and the manner in which the various channels of the equipment are interconnected. Such a specification is called a configuration. It is anticipated that the system control structure for defining a configuration will be similar to that of the BUILD commands in the existing HSDS program. The primary difference is that the new system will have to be able to describe configurations in terms of the logical equipment types (e.g. any 642B computer) as well as specific equipment identifiers (e.g. CPU-2). This added capability is required so that the scheduling program will have maximum flexibility in equipment assignment. The current BUILD routines work only with specific equipment identifiers, so that any substitutions must be made manually at hookup time.

Definition of the format and mnemonics for specifying configurations in this more general fashion is a FCDSSA responsibility (Action Harry Gold and Basil Brown).

When a user issues a "define configuration" command the system will check to be sure the configuration name input by the user does not duplicate one already in the configuration file, and then will copy the user's specification into the configuration file as a new entry. Possible elaborations include a) checking to be sure that each configuration is unique and b) defining new configurations as minor modifications of existing configurations.

Summary of files affected:

read CONFIGURATION file.,

write CONFIGURATION file.

2. Display Configuration. Several different displays of the information in the configuration file should be available upon request. All of these displays are simple input-output formatting exercises which will be routine to program once the configuration format is determined by FCDSSA. The displays available should include the following:

a) List the names of all configurations currently in the file.

b) Display the configuration with name XXXX. (If XXXX is not a previously defined configuration, return an error message.)

c) Display all configurations.

d) In b and c above, the user will have the option to list only the equipment required or also the details of channel interconnections.

e) List all configurations which require equipment type z.

Summary of files affected: read CONFIGURATION file.

3. Delete Configuration. Obsolete configurations can be removed from the configuration file. This interaction should be reserved for control desk use to prevent accidental erasures in the file. As a possible elaboration, the system

might check to be sure that no currently pending job request uses the configuration before it is deleted, since otherwise at scheduling or hookup time the job will request a configuration whose description is no longer available in the system.

Summary of files affected:

read CONFIGURATION file

erase CONFIGURATION file,

possibly read PENDING REQUEST file.

4. Enter Schedule Request. Users may input job requests for inclusion in the schedule at any time. Job requests which arrive before the weekly scheduling time ("weekly requests") are accumulated in the PENDING REQUEST file until scheduling time. Job requests which arrive after the scheduling deadline ("daily requests") are kept in the PENDING REQUEST file and treated on a space-available basis. In either case, entering a schedule request is a simple input-output operation. At this time we will define formats for the input and the PENDING REQUEST file and describe the editing checks that the program should make on each new request.

Any job request must contain information in three basic areas: job identification, equipment required, and time required. The job identification is reasonably straightforward. The primary job identifier is a user assigned job

name. Users will have to be precise about using exactly the same name when displaying information about their job request or its place in the schedule. Other elements in the job identification are the task number (primarily for accounting--no real function in scheduling), the user's organization code (in the current view, the scheduling algorithm will sort requests by code, and each code may prioritize its requests if desired), a priority sequence if the user's code wishes to assign one, and the user's phone extension so the control desk can call the user if necessary.

Specification of the equipment required for a given job is straightforward. The user will merely specify the name of the standard configuration which he requires. If there is not an existing configuration for the required equipment or if the user doesn't know its name, then the user will input a special code (say 999) and the "define configuration" program will be called to establish the new configuration or to search the existing configuration file for the name of the configuration matching the user's needs. Users will be able to specify alternative configurations if several different configurations will meet their needs.

Specification of the time required for a job request has several aspects. Users will first specify the week for which the request is intended, and the system will then check the request submission deadline to see if this is a "weekly" request or a "daily" request. Then the user must specify

how much time is required and when he would like the job to be scheduled. Specification of the information is complicated by the variety of different jobs which the system must handle. For most users (see exceptions below) the number of hours of time required is fairly firm and easy to specify. However, different users vary widely in their desires about when during the week their job should be run.

a. Certain users, notably maintenance and training, have priority status during certain times of the day and try to concentrate their jobs during these times.

b. Some users have preference for certain times of day, others for certain days of the week, others for various combinations of both day and time. Almost everyone prefers day time shifts to night shifts, but there are some exceptions.

c. Because of other commitments, some users are <u>unable</u> to run their jobs at certain times.

d. Some job requests want several time blocks on different days with at least a day between blocks for debugging.

e. Some user requests (e.g. ASIS05) are submitted as a single large block of time with the understanding that the scheduler will spread this time in smaller blocks throughout the week at his convenience. These smaller blocks are then allocated to different ASIS05 users by the ASIS05 group without having the scheduler involved.

f. It is virtually certain that not all users will get their first preference in time assignments. Thus the system will allow a user to specify several alternative times (perhaps many) and indicate his preferences among these times.

From the standpoint of the scheduling algorithm, each separate block of time will be treated as a separate request. For example, a job asking for four hours on Monday and four hours on Wednesday will be split into two separate job requests which are scheduled independently. The system will assign a "segment number" to differentiate between the two blocks. For each separately requested block of time the scheduling program needs a list of acceptable start times, arranged in preference order. All acceptable times should be included in the list and any time which is impossible should be left off the list. The scheduling program will then step through the acceptable times in the given preference order, until it finds a time where the job fits into the schedule.

For submitting a schedule request, however, such a format might be unwieldly since the list of possible start times might be quite long. An alternative input format which can easily be translated into the preference ordered time list is suggested below.

Each job request can ask for as many blocks of time as desired. For each block the user specifies

a) the number of hours in that block

b) day-time combinations which are desirable start times

d) day-time combinations which are not possible start times.

Examples

1. (4 M0 8) indicates that four hours time is required, and that Monday 0800 is the desired start time.

2. (6 H) indicates that six hours time is required and that Thursday (H) is the desired day.

3. (5 M08, W12, H) indicates that five hours time is required, and that Monday 0800, Wednesday 1200, or anytime Thursday are desirable start times.

4. (4 M08, NOT T, W, H) indicates that four hours on Monday at 0800 is desired, and that no time on Tuesday, Wednesday, or Thursday is acceptable (perhaps the user will be out of town).

5. (8 T08, W, NOT F16) indicates eight hours is required, Tuesday 0800 or anytime Wednesday are desirable, but Friday 1600 is impossible.

6. (4 M08), (6 T08), (4 W12, NOT F) requests three separate blocks of time each of which is interpreted as above.

Input to such a time specification could be in the compact form shown for users who understand the format and could also easily be expanded into a prompt-and-respond mode on terminals for users who are not so familiar with the format.

Translating this format into the preference ordered list of start times is a straightforward process: desirable times are placed at the top of the preference order, and impossible times are omitted from the list. Times which are not mentioned at all will appear on the list at the bottom of the preference order, and, of course, the user will have no control over their ordering.

For users who want to place a preference ordering on all of their acceptable times, the option of just inputing the ordered list of start times should also be available.

It should be noted that this time specification format, while probably adequate for most jobs, does not allow for specifying minimum intervals between blocks or for splitting large request blocks into smaller pieces. One way of handling special cases is to include a field in the request input for "comments to the scheduler" so that the control desk's human scheduler can force the interactive computer scheduling program to satisfy side constraints that are hard to anticipate or provide for in automatic scheduling.

Editing checks should be built into the program which accepts job requests to ensure that the request makes sense. For example:

a) The job name should be unique for each job request submission. Thus the system should check each new name against those already in the file.

b) Other identification information should be reasonable, e.g. code numbers should be for codes that exist.

c) All configuration names should be checked against the configuration file, and the user should be required to define any missing configurations.

d) All times should be checked to be sure they are within the proper ranges.

e) The resulting file record in the PENDING REQUEST file should be echoed to the user to allow validation at entry time of the actual file record, and immediate correction of any errors found.

Summary of files affected:

read PENDING REQUEST file

write PENDING REQUEST file

read CONFIGURATION file.

5. Display Schedule Request. The system should display any job request (or all) on demand. The display is a routine input/output exercise. For preliminary implementation, simple display of all the information in the file record is probably adequate. A more elaborate display routine might selectively edit part of the data (e.g. list names of all jobs from code 06 or all jobs using configuration XXXX).

Summary of files affected:

read PENDING REQUEST file.

6. Modify or Delete Schedule Request. Changes in user requirements or input errors may require changing or deleting requests which have been previously entered. Such modifications or deletions should be protected functions with only the user who submitted the request or the control desk allowed to change the request. For initial implementation, the easiest way to handle a modification is to delete the old request and re-enter the entire modified request. If modifications are frequent it might be worthwhile to develop special modification routines later.

Summary of files affects:

read PENDING REQUEST file

write PENDING REQUEST file.

7. Construct Schedule. Once a week, at scheduling time, the system produces a schedule of time and equipment assignments for the following week. The schedule construction process will be an interaction between a human scheduler (CONTROL DESK function) and a computer program scheduler. The program will be able to rapidly generate alternatives, will perform the basic bookkeeping operations, and will use simple heuristics to construct portions of the schedule.

When these heuristics fail, or at other appropriate times the human scheduler will intervene to suggest alternatives for the computer to try or to process additional information (such as the comments field in a schedule request) which the computer cannot handle.

The result of the scheduling process is a list of the scheduled time and equipment assigned to each job request, and a list of the job requests (if any) which could not be scheduled.

Since the scheduling interaction is complex, its decision logic must be specified in considerable detail. We will postpone this detailed description of the scheduling process until Section IV.

Summary of files affected: As indicated in Figure 2 of Section II-B the scheduling process will require read access to all of the system files, and will write on the SCHEDULE file.

8. <u>Display Schedule</u>. A variety of displays of the weekly schedule will be required to meet the needs of various users.

a) The simplest such display is for an individual job. The display would merely repeat the job request identification fields, specify the day and time assigned and list the equipment assigned. If the scheduler has found it necessary to assign equipment which is not currently in an UP maintenance status, a note to this effect should be included.

b) Using the same format as in a) above, it would be desirable to be able to list subsets of jobs such as all training jobs, all jobs scheduled for the Monday afternoon shift or all jobs using computer CPU2. This is a routine sort or search problem.

c) In addition to the displays above, the control desk scheduler will need to have available more global information about the schedule if he is to interact effectively with the system during the schedule construction and schedule modification processes. The types of display available to the scheduler and their format will be crucial to the success of the scheduling effort, and will be discussed in more detail along with the scheduling process in Section IV.

Summary of files affected:

read SCHEDULE file.

9. Modify Schedule. After a schedule has been constructed, changes in equipment availability, changes in user needs, or in extreme cases, new and extremely important jobs which must be scheduled will require modifications in the existing schedule. Sometimes the change may be simple (e.g. substitute CPU H for CPU K in job XXX), but other changes may require rework of substantial portions of the schedule. The schedule modification process will be interactive and similar to the original schedule construction process

except that it starts with an existing partial schedule. Further details are reserved for Section IV.

Summary of files affected: Schedule modification is like schedule construction in that it can affect any of the system files.

10. Hookup Equipment. At the beginning of each shift, the jobs scheduled to start in that shift must be hooked up. Detailed discussion of the hookup system is beyond the scope of this research project, but a brief sketch is in order. The proposed system would use the schedule file to determine the jobs and equipment to be processed, and then the configuration file would provide details of the channel interconnections. Using this information, the system will create a set of HSDS hookup commands for each of the jobs to be run. These would then be sent to the HSDS control computer which will actually perform the hookup. The major requirements, in addition to the existing HSDS programs, are for a processor to develop the set of HSDS commands and for a communication link from the system to the HSDS control computer.

Summary of files affected:

read SCHEDULE file

read CONFIGURATION file.

11. Unhook Equipment. When a job is done, the equipment is unhooked. The discussion of equipment hookup above is relevant. It is probably desirable to have human intervention to prevent automatic disconnecting of jobs since a brief extension of time might allow job completion.

12. Change Equipment Status. As a part of the equipment file, the system will maintain an equipment status list. This would incorporate or replace the HSDS status list and Harry Gold's equipment status program. There will be three possible status indicators for each piece of equipment. UP, REDUCED CAPABILITY (REDCAP), and DOWN. At HOOKUP time, the system will refuse to hook up any equipment which is DOWN and will give a warning message about REDCAP equipment. Since the schedule is made up as much as 10 days before run time, the scheduler will assume that DOWN and REDCAP equipment can be fixed in time and will schedule it if necessary (with a warning message). If equipment is known to be down for an extended period (awaiting parts or shipped out for repair) and will not be available next week, maintenance may so indicate by preemptively scheduling that equipment into a maintenance status for the entire week. Then the system will not assign it to anyone else. Formats for inputs and displays have been developed in previous status programs, so we will not concentrate on them at this time.

Access to the "change equipment status" program is restricted to maintenance personnel only

Summary of files affects:

read EQUIPMENT file

write EQUIPMENT file.

13. Display Equipment Status. On demand the system will display the current maintenance status of any piece of equipment that it schedules. Summary displays such as "all CPU's" or "all DOWN equipment" should be available. For equipment in the DOWN or REDCAP categories, a maintenance file will contain comments about the equipment to help users decide whether, for example, their job can use a piece of REDCAP equipment.

Summary of files affected:

read EQUIPMENT file.

14. Change Basic Data Files. Changes to basic system data files (such as the equipment list) will sometimes be required (for example, when a new piece of equipment is acquired). Routines should be available to make such changes possible. Their use is, of course, restricted so the typical user will never encounter them.

D. Summary of System Interactions

In the following table we summarize the above interactions and indicate the people who will be initiating them. Several of the interactions should clearly be reserved for maintenance or for the control desk. Other interactions such as Modify Schedule Request should be available to the user who submitted that request, but not to other users. This can be handled by appropriate code words in the control programs, or by restricting these functions to a single central authority such as the control desk.

Interaction	User	Control Desk	Maintenance
1. Define Configuration	X	X	X
2. Display Configuration	X	X	X
3. Delete Configuration		X	
4. Enter Schedule Request	X		X
5. Display Schedule Request	X	X	X
6. Modify or Delete Schedule Request	X	X	
7. Construct Schedule		X	
8. Display Schedule	X	X	X
9. Modify Schedule		X	
10. Hookup Equipment		X	X
11. Unhook Equipment		X	X
12. Change Equipment Status			X
13. Display Equipment Status	X	X	X
14. Change Basic Data Files		X	

X means that the indicated person initiates the indicated interaction.

III. FILE DESCRIPTIONS AND FILE MANAGEMENT

A. File Descriptions

The proposed computer facilities scheduling system requires a number of data files to be stored and accessed as schedules are prepared and implemented. In this section we provide descriptions of these files, their contents, and some suggestions for file management in the system.

Throughout we will concentrate on the minimum files necessary to perform the scheduling job recognizing that other aspects of the system may require additional files or additional entries in the files we define. For example, as part of the equipment file it might be useful for someone to know the date of acquisition of each piece of equipment. Since this information does not impact on the scheduling function, we choose not to incorporate it into our description of the equipment file.

A list of the files required by the scheduling system and their contents follows.

1. EQUIPMENT file

The equipment file contains information about each piece of equipment that the system schedules. The information required consists of:

a) a unique identifier for each piece of equipment (The HSDS mnemonic is a logical identifier to use.)

b) an equipment status code to indicate the current maintenance status of the equipment. The three possible status values are UP, DOWN, and REDUCED CAPABILITY.

This file should have space for several hundred pieces of equipment.

2. MAINTENANCE file

Verbal comments describing the nature of maintenance required on DOWN and REDCAP equipment can be useful to users in deciding whether they can use the malfunctioning equipment. For example, if only one channel of a device is bad, and the user's job doesn't access that channel, then he may be able to continue even though the equipment is marked REDCAP. This file will contain entries for DOWN and REDCAP equipment only and will consist of

a) the equipment identifier (same as in the equipment file)

b) the status indicator DOWN or REDCAP

c) comments on the nature of the problem.

Other information such as time of failure are important for maintenance recordkeeping, but do not directly affect the scheduling function.

Review of recent maintenance activity should give an indication of the required size for this file.

3. PENDING WEEKLY REQUEST File

As requests are received they are accumulated in this file until scheduling time each week. The data which is input in each job request will comprise one record of this file, and should include the following data items:

a) job name

b) segment number (system assigned if a request includes several blocks of time)

c) task number

d) organization code

e) priority sequence within code (optional)

f) user name

g) phone extension

h) number, n, of acceptable configurations

i) configuration names for the n acceptable configurations

j) week for which the request is intended

k) number, t, of acceptable start times

ℓ) preference ordered list of the t acceptable start times

m) comments to the scheduler, if any.

Space for 200 job request segments per week should be adequate.

4. <u>CURRENT WEEK SCHEDULE and REQUEST file</u>

This file contains information about all the job requests which are either scheduled to be run during the current week or awaiting scheduling as a daily request. For each of these jobs it is necessary to retain all of the job request information listed in file 3 above since changes during the week may necessitate rescheduling of the job. In addition to data items (a) through (m) of file 3, each record of the Current Week file will contain the following information about the schedule relevant to each job:

n) scheduled start time

(= 999 if the job has not yet been scheduled)

o) the configuration name under which the job was scheduled (blank if not yet scheduled)

p) a list of the specific equipment identifiers which are assigned to this job in the schedule.

Space for 200 records should be adequate.

5. NEXT WEEK SCHEDULE and REQUEST File

The format of the Next Week file is identical to that of the Current Week file, except that it contains job request and schedule information for the week following this week. Such a file is required since next week's schedule is prepared before this week's schedule has all been run, and hence there can be two different schedules in existence at a given time. Section III-B will discuss the transfer of data among the Request file, the Current Week file and the Next Week file.

Each record of the Next Week file contains data items a through p listed under files 3 and 4 above.

Space for 200 records should be adequate.

6. CURRENT WEEK SCHEDULE CROSS REFERENCE File

The schedule cross reference file contains, for each time during the week, a list of the job ID for all the jobs which are scheduled to be running at that time. This includes jobs starting at that time as well as jobs starting at earlier times which overlap into that time period.

Space is required for one record for each time period with each record containing, perhaps, up to twenty job ID's.

7. NEXT WEEK SCHEDULE CROSS REFERENCE File

This file is identical to the Current Week Schedule Cross Reference file except that it covers a different period of time.

8. CONFIGURATION File

The configuration file contains a list of the equipment required for each job. Each configuration has a separate record consisting of

a) unique configuration name

b) equipment required for the job

c) channel interconnection instructions.

An estimate of size for this file is difficult to give at this time since details of the format for describing configurations is not yet complete. We anticipate a fairly large number of distinct configurations, perhaps several hundred.

9. HISTORY File

It is likely that some information will be retained in history files after it has become obsolete for current scheduling purposes. For the moment we will ignore these files as they do not influence the scheduling operation.

B. File Management

Since the proposed system implements a weekly schedule in continuous real time, there will clearly have to be a time (or times) during the week when files are cleared of last week's data and loaded with this week's new information. In this section we approach the problem by examining the necessary retention of information over time in the system. In particular we concentrate on the files which are changing completely every week--the Request files, the Current Week file and the Next Week file.

For concreteness let us again denote the days in three consecutive weeks (as in Section II-B) as follows:

M	T	W	H	F	A	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19

and consider the timing of requests and schedules for the week 13-19.

Weekly requests for week 13-19 can be input on days 1-7, and must be retained in some form until they are run (as late as day 19). Thus a weekly request may be in the system for as long as 19 days.

Daily requests for week 13-19 can be input on days 8-19 and must be retained until they are run, or, if not scheduled, until the week is over (as late as day 19). Thus a daily request may be in the system for as long as 12 days.

It should be noted that even after a request is scheduled it is still necessary to retain the request since if schedule modifications must occur, some jobs may have to be rescheduled. Since requests may be in the system for nearly 3 weeks in a weekly scheduling cycle, there will clearly have to be either multiple files or overlap between several weeks in a single file.

The schedule for week 13-19 will be developed on day 8 and reviewed and finalized on day 9. It will be retained until day 19, for a total of 12 days in the system.

Given these preliminary observations, we refer to Figure 5 to illustrate the flow of information in the files. As the weekly requests for week 13-19 are submitted (on days 1-7) they are accumulated into the Pending Weekly Request file. On day 8 the entire Pending Weekly Request file is moved into the Next Week file leaving the Request file empty to accept requests for the week 20-26. The schedule is then constructed, and, as each job is scheduled, its time and equipment assignments are added to its record in the Next Week File. At the end of the week (day 12) the jobs for the week just completed

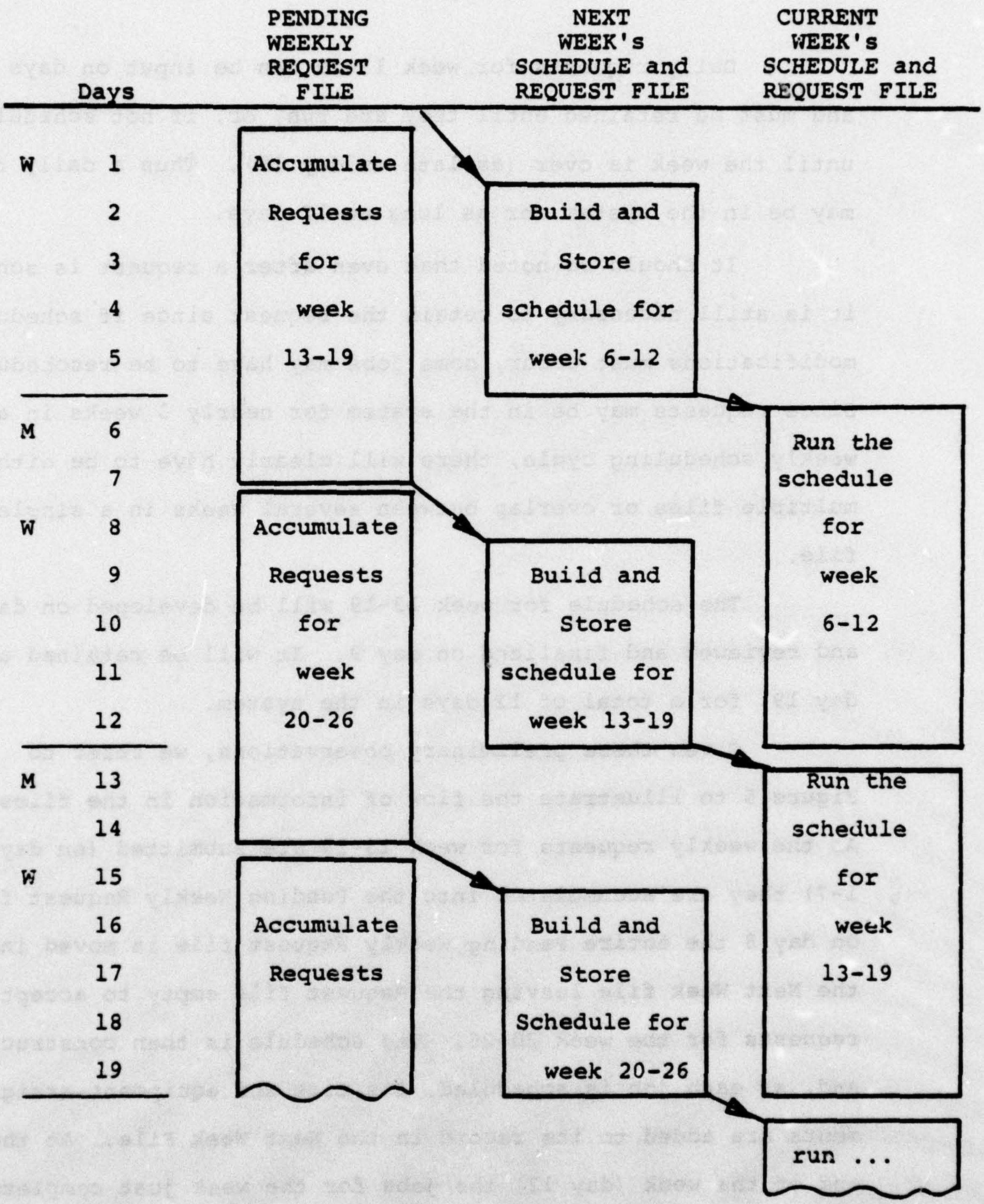

Figure 5. File Management

(6-12) are erased from the Current Week file and the schedule for the week 13-19 is moved into the Current Week File. Equipment hookups are then made from the Current Week file throughout the week.

Any daily requests for week 13-19 that arrive on days 8-12 are added to the Next Week file and scheduled if possible on a first-come-first-served basis. Daily requests for week 13-19 arriving on days 13-19 will be added to the Current Week file in the same manner.

Although they are not included in Figure 5, the Current and Next Week Schedule Cross Reference files are handled in the same fashion as the Current and Next Week Schedule and Request files.

IV. DESCRIPTION OF THE SCHEDULING PROCESS

A. Overview of Scheduling Operation.

At scheduling time each week the Pending Weekly Request file has accumulated a number (perhaps 100-200) of distinct job request segments for time blocks of varying length and equipment configurations of varying complexity. The job of the scheduler is to assign start times and equipment in such a way that

a) each individual request is satisfied,

b) the equipment needs of all jobs scheduled to run at any time during the week do not exceed the equipment available to be used and

c) the pieces of equipment assigned to each job are physically located in convenient spatial arrangements.

During the week the prepared schedule may have to be changed to reflect changes in job requirements or equipment availability. When this occurs the scheduler's job is to make required changes to still satisfy a, b, and c above with as few modifications to the existing schedule as possible.

Both the schedule preparation activity and the schedule modification activity are interactive processes with an on line computer scheduling program trying many alternatives and keeping track of equipment availability and scheduled times and equipment throughout the process. When the computer's scheduling

attempts fail, or when additional comments to the scheduler impose constraints the computer cannot handle, the human scheduler will be notified. He will then attempt to resolve the issue, or if that seems impossible, he will make the decision to skip the troublesome job and move on to schedule others.

B. Initial Conditions for Scheduling

1. Time Specification.

As discussed in Section II.C.4 of this report, we assume that each job request segment includes a preference ordered list of start times that are considered acceptable for that job. The most desirable time should be first on the list, and any time which is not acceptable should not be included anywhere on the list. The schedule program will attempt to schedule the job at each listed time, in preference order, until a workable time is found. Although we attempt to give each job a time as high on its preference list as possible, we also consider it more important to get jobs scheduled than to give them their most preferred time. Thus we would choose a schedule in which two jobs each get their least preferred time over a schedule in which one job gets its most preferred time and the other job cannot be scheduled at any acceptable time. The program will never attempt to schedule a job at a time not on its list of preferred times, although the manual scheduler may, as a last resort, propose such a time.

2. Equipment Specification.

Each job request specifies a number (often only one) of acceptable equipment configuration names. For purposes of the scheduling algorithm only part of the configuration specification is required. The scheduler needs to know the equipment requirements for the job, but has no use for the channel interconnection instructions. We will assume that each acceptable configuration has been summarized and the equipment specification is presented in the following form:

Equipment type	Number Required	Specific equipment ID for all equipment which can be used for this requirement
CPU-1	1	CPU-1
Any type B Computer in C&S-2	2	CPU-M, CPU-L, CPU-K, CPU-H, CPU-P, CPU-Q, CPU-R
Any MTU in C&S-2	1	MTU-A, MTU-B, MTU-C, MTU-G, MTU-J, MTU-K
NTDS mockup	1	NTDS-1, NTDS-7, NTDS-8

In particular it is important that configurations be specified in as much generality as possible to provide maximum flexibility for the scheduler. If the user is able to use any type B computer then a configuration which specifies CPU-M is unnecessarily restrictive and will lessen the user's chances of being scheduled.

Given equipment specifications in the above format, the scheduling computer program will select the number required of each equipment type from the specific candidates listed. The selection process will check to be sure the equipment is not already assigned at this time, and will attempt to select spatially convenient configurations of computers, magnetic tape units, and teletypes.

3. <u>Assumptions about Equipment Availablity</u>

Since the schedule is initially prepared from 5 to 12 days before the jobs are actually run, equipment availability at run time is likely to differ from that at scheduling time. It does not seem possible to get reliable down-time estimates for malfunctioning equipment, so it is difficult to predict equipment availability for the following week. The scheduling computer program will, thus, assign equipment even though its current status is not UP. This is equivalent to assuming that equipment which is in DOWN or REDCAP status at scheduling time will be fixed by the time it is needed during the next week. This perhaps optimistic assumption is considered preferable to the alternative assumption that any equipment not UP at scheduling time will not be UP any time during the next week. When DOWN or REDCAP equipment is assigned in the schedule it should be flagged so the user will be warned to check the status again as his assigned time approaches. Then if the equipment is still down (or if other equipment has failed in the interim) he can initiate corrective action with the scheduler.

4. Job Request Processing Sequence.

The complexity of the scheduling task when users are allowed to express multiple preferences for times and configurations, and when other constraints are imposed by command organization (e.g. Training jobs have priority in daytime shifts, but not at night), precludes scheduling methods which attempt to consider all factors and all requests simultaneously. Thus the proposed computer facilities scheduling program will operate sequentially, scheduling one job at a time, and occasionally backtracking to change earlier assignments when it is advantageous to do so.

This mode of scheduling requires determination of the sequence in which the jobs are to be considered. Jobs which appear early in the sequence will be more likely to be scheduled than those late in the sequence, so, in some sense, the sequencing should reflect job importance or priority where these ideas are clearly defined and agreed upon. Thus, for example, it seems reasonable to place the job requests for early morning scheduled block maintenance in C&S1 and C&S2 at the top of the job sequence since they do have priority over all other jobs at this time. Similarly, training jobs which request time during the daytime shift are acknowledged to have priority over other jobs during that time and thus should appear earlier in the job request sequence.

There does not, however, seem to be universal agreement on the relative importance of one training job versus another, or of one program development and test job versus another, so

large portions of the job processing sequence are still not determined. *Several considerations are relevant to this question:*

a) It seems likely that if large jobs are scheduled first, then it will not be too hard to fit small jobs into the "holes" left in the schedule toward the end of the sequence. Conversely, if the large jobs are left until last, the chance of finding large "holes" remaining to fit them into seems much smaller. Thus placing large jobs earlier in the sequence will probably yield better schedules. There are several possible measures of "largeness" for a job (time required and number of computers being obvious measures), but it is not obvious which to use or how to combine them.

b) If a particular responsibility center within the command (say a given code) feels that it can prioritize the jobs within its area and desires to do so, then the sequential processing of jobs gives a natural way to implement the priorities.

c) Across codes it is more difficult to establish and agree on relative job importance, so the suggestion has been made that after priority maintenance and training jobs are scheduled, the job sequence should rotate among the other codes. Each code could order its jobs as desired, and the system would then take the first job from each code's list in turn, then the second job and would continue rotating among the codes until the job request file is empty.

d) A default sequence to all of the above possibilities is the first-come-first-served-sequence. In the absence of a decision to sequence in a more logical fashion, this alternative might be implemented. We do not recommend it.

We will assume that the job processing sequence has been determined as suggested above with priority maintenance and training jobs scheduled first. The remaining jobs are selected for scheduling on a rotating basis among the codes. Each code (training included) may prioritize its own jobs if it wishes to do so; otherwise the system will sort within each code according to job size. The scheduling computer program will follow the given job sequence in its attempts to generate a schedule. Of course, if the human scheduler can work his way around a problem by an adroit change in the sequence, he should have some authority to do so.

C. Decision Logic for Scheduling Subprograms

In performing the scheduling task there are some basic operations that are repeated many times in differing situations. In this section we isolate some of these basic operations and describe how they are performed. In later sections we will then refer back to these operations as subroutines or "black boxes" which can be called at will. We also will begin to define some terminology which will be used in the rest of the report.

1. Determine Equipment Availability (EQAVAL)

The basic fact which makes it necessary to schedule equipment is that only a limited amount of that equipment is available. Throughout the scheduling process we need to know which pieces of equipment are available and which are already scheduled to be used at various times during the week. Information about equipment availability will be kept in an array JEQAVA. We discuss several alternatives for handling and updating this array.

a) The simplest alternative would keep the availability of every piece of equipment for every time period during the week constantly updated in JEQAVA. For (say) 400 pieces of equipment, and if a scheduling period is one hour, then JEQAVA must contain room for 400 × 168 = 67,200 bits of information (0 = not available, 1 = available). Every time any schedule change occurs, the corresponding equipment availability bits are turned off or on. The primary disadvantage of this procedure is the space required for JEQAVA although packing schemes could help. The advantage is speed and simplicity.

b) At the expense of more processing we can save substantial space in the JEQAVA array. Whenever we need to know equipment availability, a subroutine called EQAVAL will construct the JEQAVA array for all equipment but only for the subset of times that we are currently examining (thus a nine hour job request would need 400 × 9 = 3600 bits if time periods

of one hour are used). The procedure is detailed in the flowchart of Figure 6.

The subroutine is called by

CALL EQAVAL(JTIM, JPERS, JEQAVA)

where the input parameters are

JTIM = the first time period of interest

and JPERS = the number of time periods (starting with JTIM).

The subroutine returns the two-dimensional array

JEQAVA (400 × JPERS)

of equipment availability indicators for all equipment and for the JPERS time periods starting with JTIM. The routine requires reference to the Schedule Cross Reference file to find all jobs scheduled at a given time, and to the Next Week Schedule file to find the equipment assigned for each such job. (If we are working on the Current Week Schedule, then reference the Current Week file instead).

c) A further savings in JEQAVA space could be obtained if only a subset of equipment were considered. When trying to schedule a given job, the only equipment of interest is the equipment which could satisfy that job's configuration needs. The processing would be increased by the logic required to keep track of which equipment to ignore. We have not examined this alternative in detail.

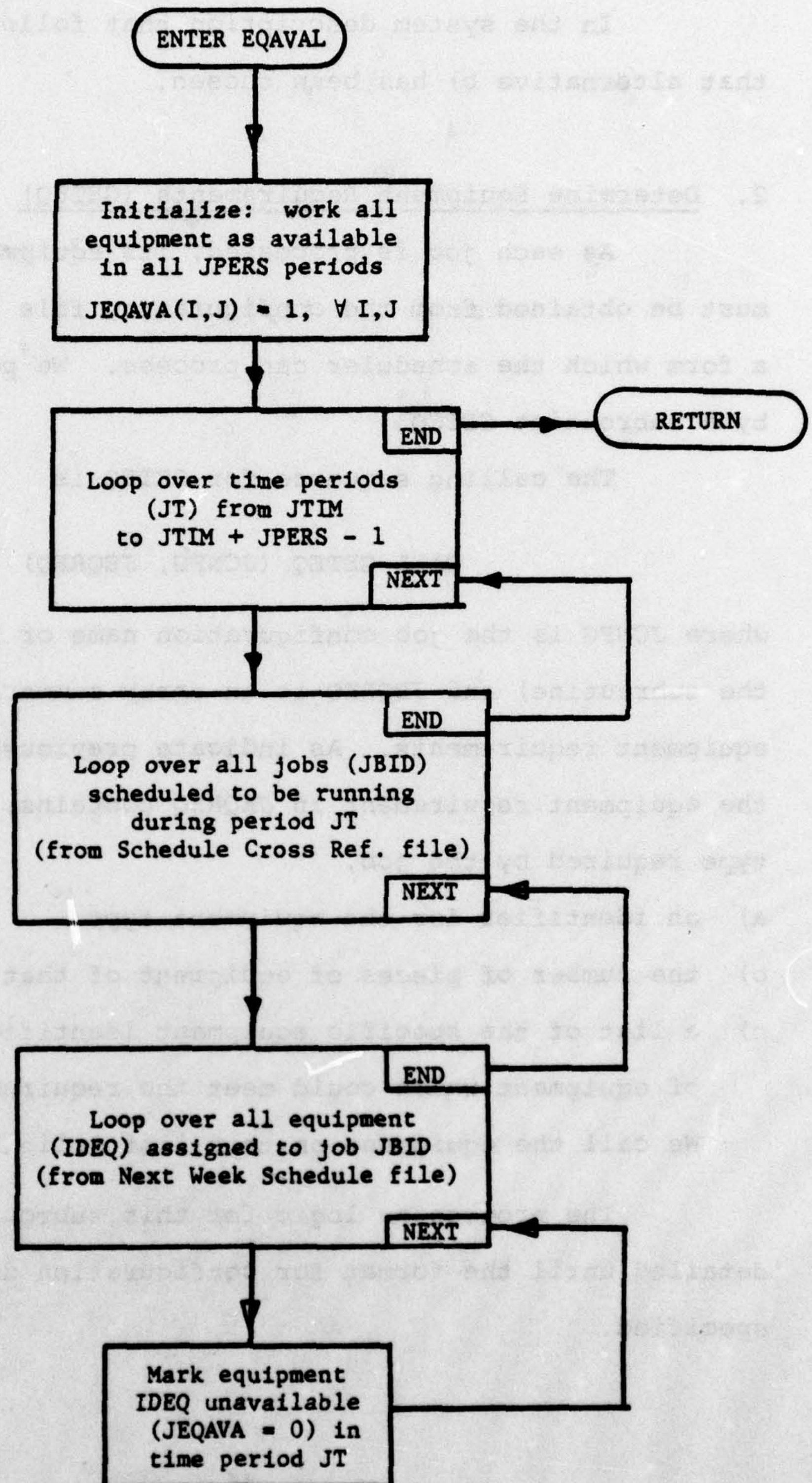

Figure 6. EQAVA SUBROUTINE

In the system description that follows we will assume that alternative b) has been chosen.

2. Determine Equipment Requirements (GETEQ)

As each job is processed, its equipment requirements must be obtained from the configuration file and converted to a form which the scheduler can process. We perform this function by a subroutine GETEQ.

The calling sequence for GETEQ is

CALL GETEQ (JCNFG, JEQREQ)

where JCNFG is the job configuration name or number (input to the subroutine) and JEQREQ is an array summarizing the resulting equipment requirements. As indicate previously in Section IV-B-2 the equipment requirement in JEQREQ contains, for each equipment type required by the job,

a) an identifier for the equipment type
b) the number of pieces of equipment of that type required
c) a list of the specific equipment identifiers for all pieces of equipment which could meet the requirement for this type. We call the equipment on this list "eligible" equipment.

The processing logic for this subroutine cannot be detailed until the format for configuration descriptions has been specified.

3. Insert Job in Schedule (INSERT)

A crucial operation in the scheduling process is to insert a given job into the schedule at a given time. The primary tasks involved are the determination of whether the equipment required by the job is available at the given time, and if equipment is available the selection of the specific pieces of equipment to assign to yield a physically convenient equipment layout.

The INSERT subroutine has calling sequence

```
CALL INSERT (JOB, JTIM, JPERS, JCNFG, JEQREQ, JEQAVA, JACTN, JOK)
```

with input parameters

JOB = job identification

JTIM = start time to be tried

JPERS = length of job

JCNFG = configuration identifier--not used in INSERT, but we want to write it onto the schedule file later

JEQREQ = equipment requirement for this job (previously prepared by subroutine GETEQ)

JEQAVA = equipment availability at the indicated times (previously prepared by subroutine EQAVA)

JACTN =
- 0 or 1 — if this is only a trial--return 0 or 1 in JOK, but do not actually schedule the job
- 1 — if this is for scheduling--if the job can be scheduled then do so

and a single output indicator

JOK =
- 0 — if the attempt to select equipment failed
- 1 — if the attempt succeeded.

In addition if the scheduling attempt succeeds and if JACTN = 1, the subroutine will write output onto the appropriate record of the Next or Current Week Schedule file giving the scheduled time JTIM, the selected equipment, and the configuration used JCNFG, and will also enter this job into the Schedule Cross Reference file.

In accordance with FCDSSA guidance, the INSERT routine will concentrate on physical location for computers (CPU's), magnetic tape units (MTU's), and teletypes (TTY's) only. Other equipment will be assigned without regard to location. CPU's are divided into four classes corresponding to 642-A and 642-B computers in each of the rooms C&S1 and C&S2. MTU's and TTY's

are selected to be in the same room as the CPU's chosen for the job and to be as close to them as possible.

To illustrate the logic of equipment selection let us suppose that the JEQREQ equipment requirement specifies 3 642B CPU's in C&S2, 2 MTU's, and 1 TTY. The three CPU's will be selected first. To accomplish this, the INSERT routine searches a stored list of all the possible CPU-B triples in C&S2 in a preference order based on physical location of these CPU's (since there are seven such computers, there are $\binom{7}{3} = 35$ possible tiples--the list is not very long). Each possible triple is checked for eligibility (against the JEQREQ list) and availability (against the JEQAVA array). The first acceptable CPU triple found is assigned to this job (hence the best available physical arrangement of CPU's is selected).

Next MTU's and TTY's are select d to be as close as possible to the selected CPU's. This process references another stored list of MTU's in location preference order for each CPU and a similar list for TTY's.

After the location sensitive equipment is assigned, all other equipment is assigned checking only eligibility and availability. If, at any stage of the equipment selection process, not enough equipment is available to meet the requirement, then the INSERT routine terminates with a failure indicator (JOK = 0). The decision logic for the subroutine is indicated in the flowcharts of Figures 7, 8, 9 and 10 which follow.

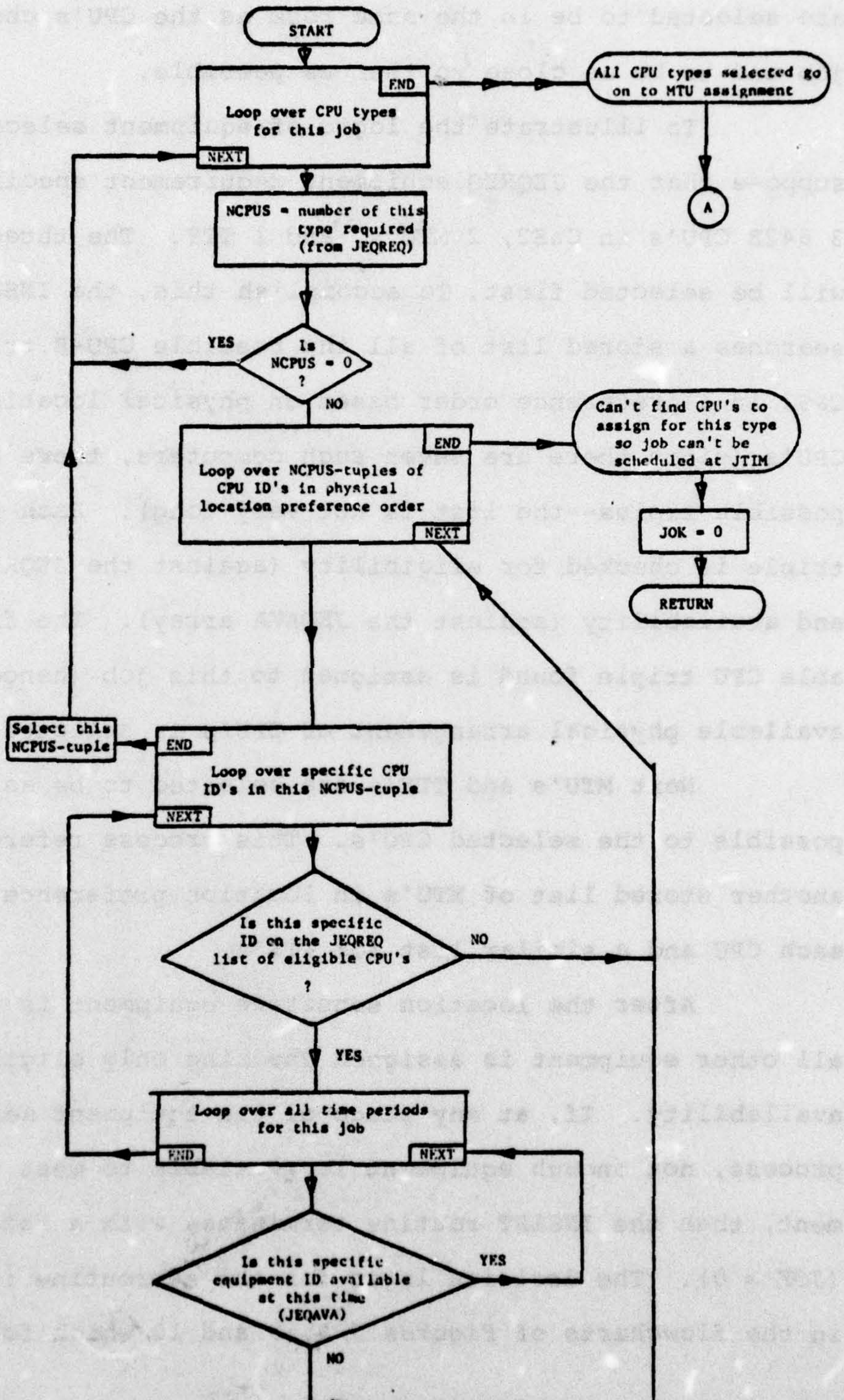

Figure 7. INSERT (CPU selection)

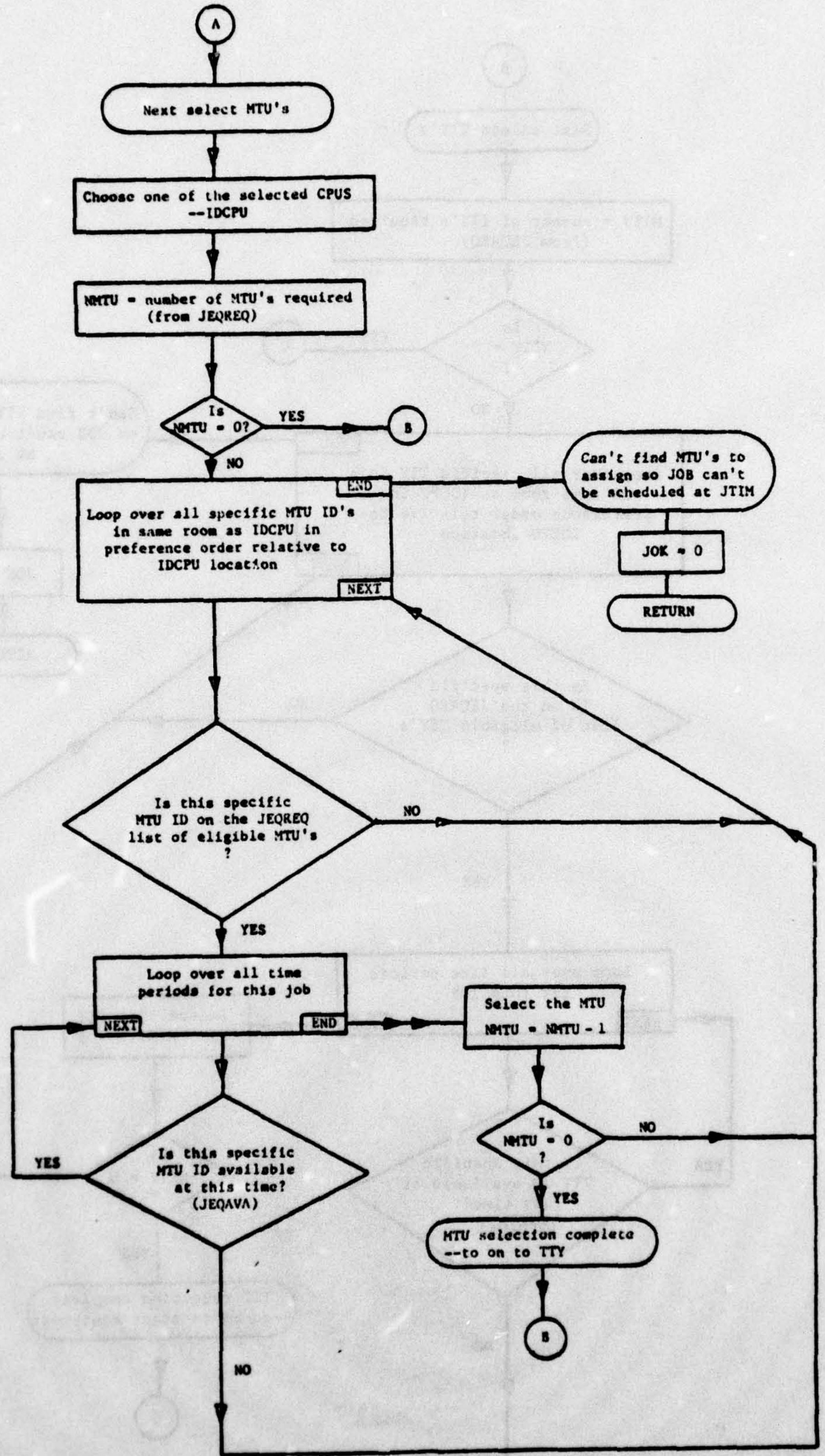

Figure 8. INSERT (MTU selection)

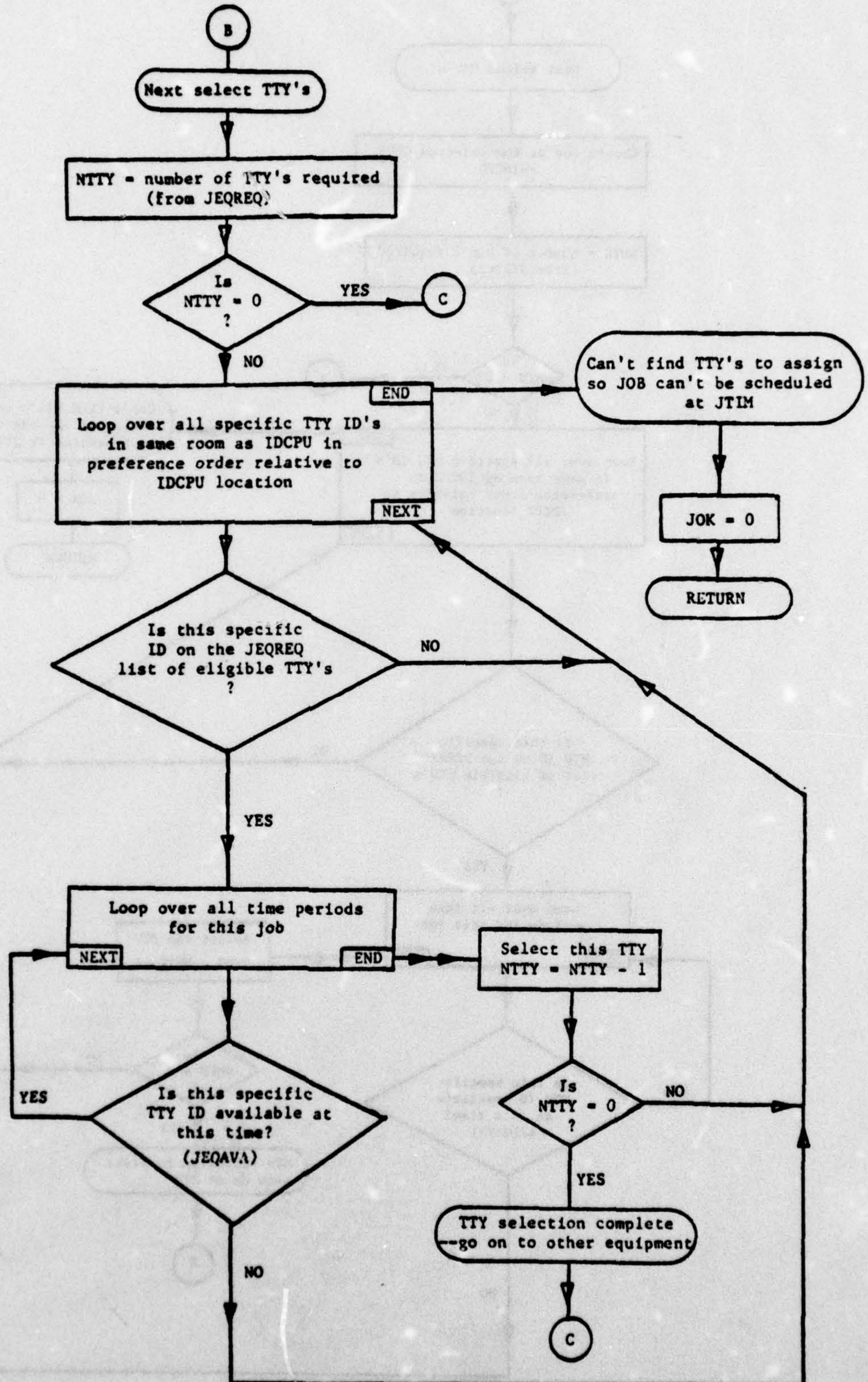

Figure 9. INSERT (TTY selection)

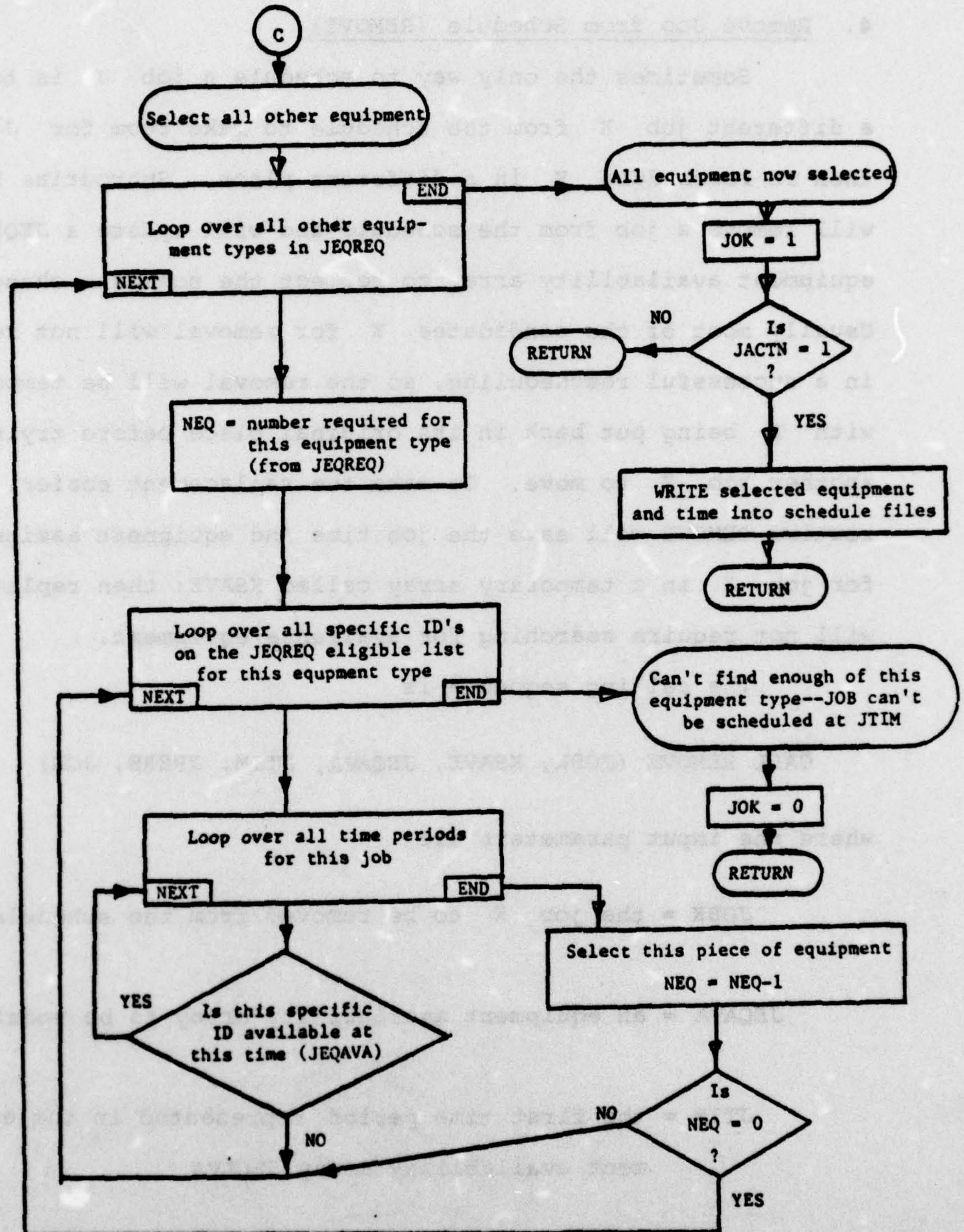

Figure 10. INSERT (select other equipment)

4. Remove Job from Schedule (REMOVE)

Sometimes the only way to schedule a job J is to remove a different job K from the schedule to make room for J and then to reschedule K in a different place. Subroutine REMOVE will remove a job from the schedule and will update a JEQAVA equipment availability array to reflect the schedule change. Usually most of the candidates K for removal will not result in a successful rescheduling, so the removal will be temporary with K being put back in its original place before trying another job K to move. To make the replacement easier, subroutine REMOVE will save the job time and equipment assignment for job K in a temporary array called KSAVE; then replacement will not require searching for available equipment.

The calling sequence is

```
CALL REMOVE (JOBK, KSAVE, JEQAVA, JTIM, JPERS, JOK)
```

where the input parameters are

JOBK = the job K to be removed from the schedule

JEQAVA = an equipment availability array to be updated

JTIM = the first time period represented in the equipment availability array JEQAVA

JPERS = the number of time periods represented in the equipment availability array JEQAVA

(Note that JTIM, JPERS, and JEQAVA usually relate to the time where we are trying to schedule job J. This overlaps with the time where job K is currently scheduled, but the times need not be identical.)

The subroutine output is

KSAVE = all scheduled time and equipment assignments for job K are saved here just in case we might have to replace job K later

and

$$\text{JOK} = \begin{cases} 0 & \text{if the job JOBK was not found on the schedule--thus cannot remove it} \\ 1 & \text{if removal completed as requested} \end{cases}$$

In addition the subroutine will delete the scheduled time and equipment for job JOBK from the Schedule files.

The subroutine decision logic is straightforward and is displayed in the flowchart of Figure 11.

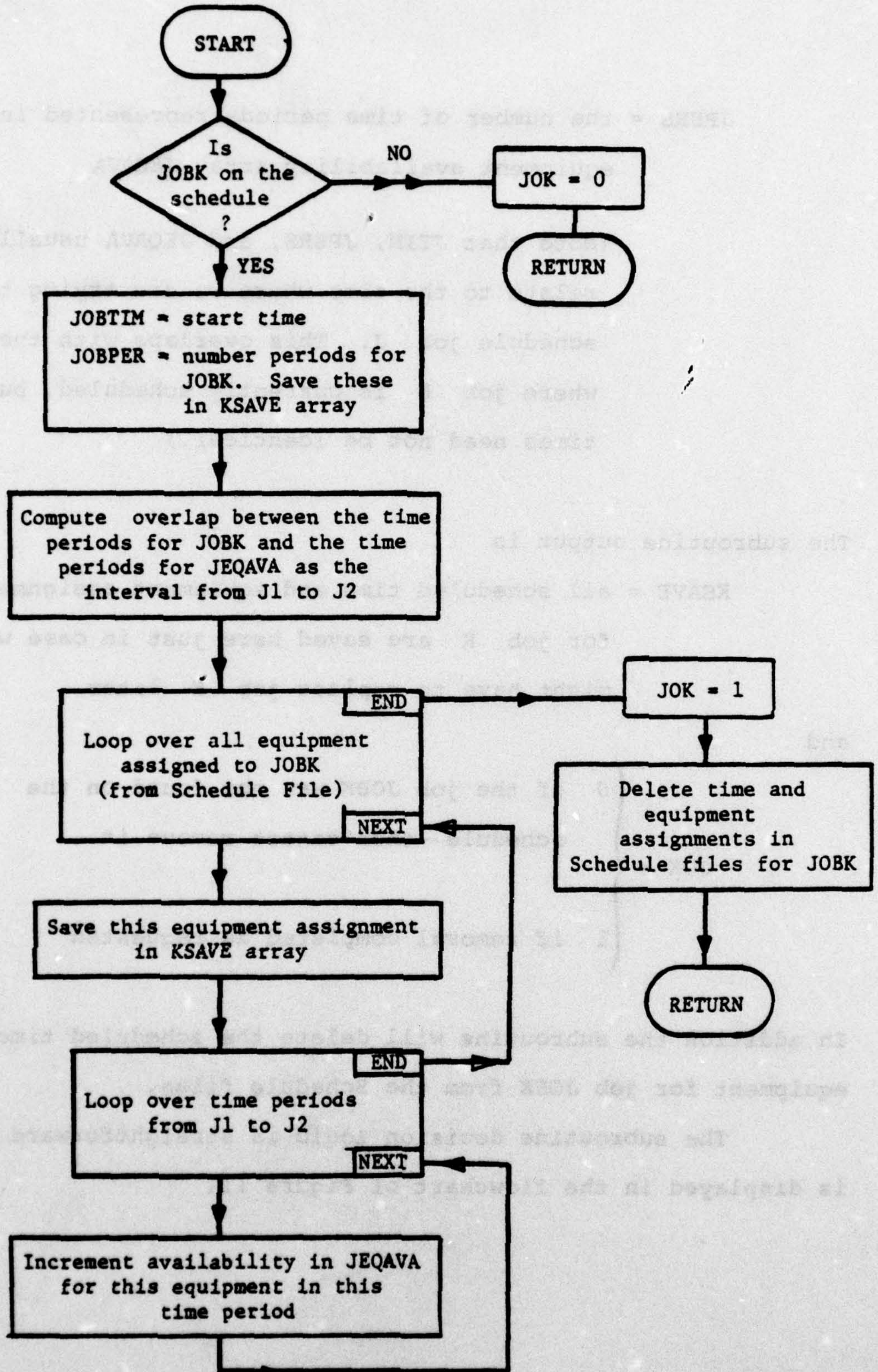

Figure 11. REMOVE subroutine

5. Replace Job in Schedule (REPLAC)

Suppose that an attempt to schedule job J by removing job K from the schedule has been made and has failed. Before proceeding to other attempts at scheduling J we should replace K in its previous place in the schedule. Since nothing else has changed, the previous time and equipment assignments (in KSAVE) are still valid, so we can bypass all the searching in subroutine INSERT and simply put job K back in its old place. Subroutine REPLAC accomplishes this and updates the equipment availability. It is assumed that no other changes have been made since a previous REMOVE operation.

The calling sequence is

CALL REPLAC (JOBK, KSAVE, JEQAVA, JTIM, JPERS)

where the input parameters are

JOBK = the job to be replaced

KSAVE = temporary array where the schedule information for JOBK is stored

JEQAVA = equipment availability array to be updated

JTIM = first time period represented in JEQAVA

JPERS = number of time periods represented in JEQAVA

The only subroutine output is that Schedule files will be updated to reflect the scheduled time and equipment for JOBK. The subroutine is essentially the reverse of REMOVE. Decision logic is given in Figure 12.

6. Compute Number of Time Periods (PERIOD)

The scheduling method described in this report assumes that the week for which the schedule is constructed is divided into a number of distinct, sequentially numbered time periods. They need not be of equal length. Each scheduling request includes a list of acceptable starting times and a job duration. For different starting times, the number of periods affected by a job may differ. Thus it is necessary to determine the number of periods affected since the process of determining whether a job will fit at a given starting time involves examining each of the affected periods to determine if sufficient equipment is available.

The program described in Chapter V uses a subroutine called PERIOD to determine the number of periods involved for a given start time and job duration. It assumes that the result is less than or equal to four periods.

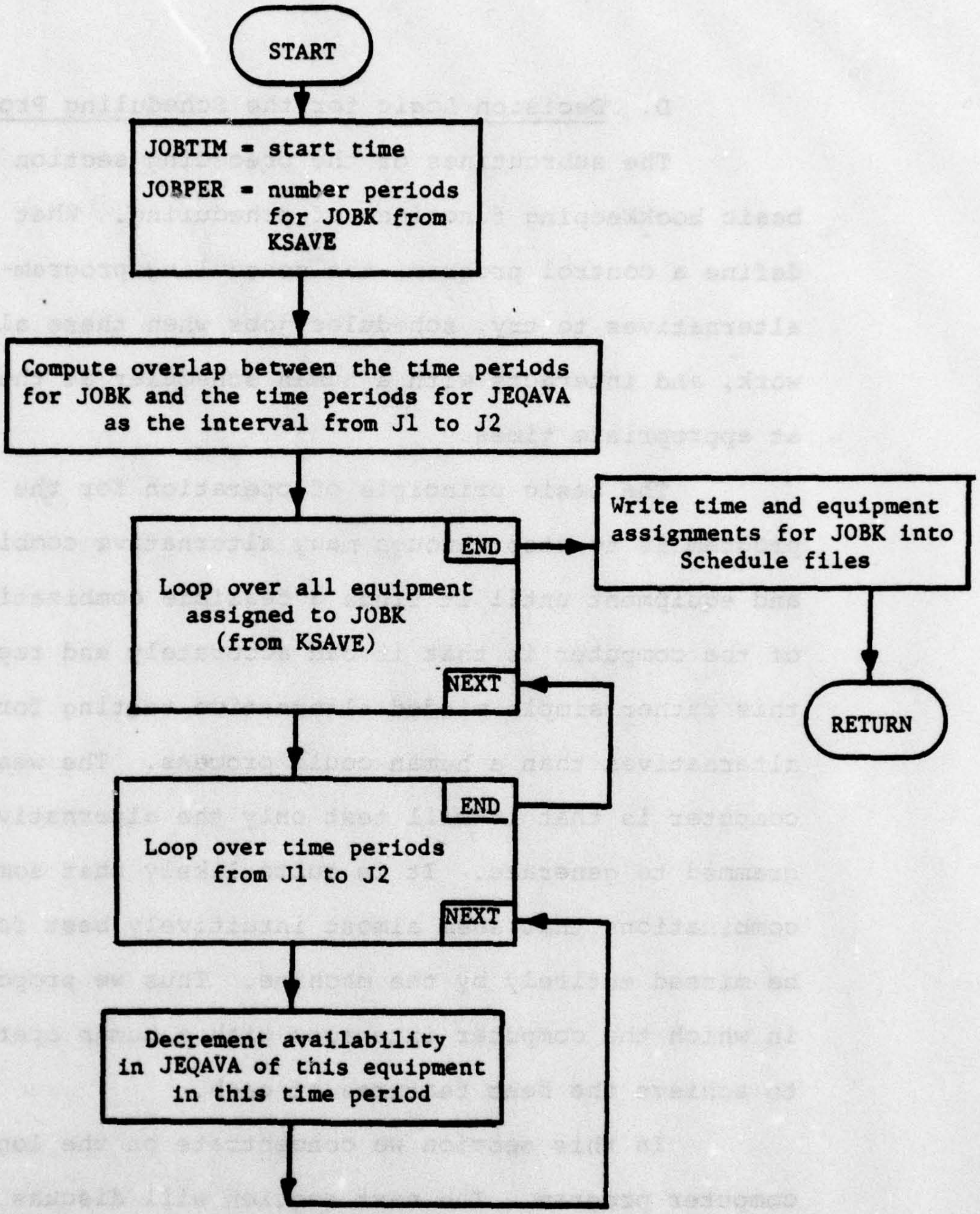

Figure 12. REPLAC subroutine

D. Decision Logic for the Scheduling Program

The subroutines of the preceding section perform the basic bookkeeping functions of scheduling. What remains is to define a control program--the scheduling program--which generates alternatives to try, schedules jobs when these alternatives work, and interacts with a human scheduler at the control desk at appropriate times.

The basic principle of operation for the scheduling program is to step through many alternative combinations of time and equipment until it finds a feasible combination. The power of the computer is that it can accurately and rapidly repeat this rather simple minded alternative testing for far more alternatives than a human could process. The weakness of the computer is that it will test only the alternatives it is programmed to generate. It is quite likely that some schedule combinations that seem almost intuitively best for humans will be missed entirely by the machine. Thus we propose a system in which the computer interacts with a human operator to try to achieve the best features of each.

In this section we concentrate on the logic of the computer program. The next section will discuss interaction between the program and the human.

1. Generation of Alternatives

In a schedule building operation which processes jobs in a given job request sequence, the typical problem is to

find a place for the next job, J, in the sequence in an already partly completed schedule. There are many alternative times and equipment selections which should be tried, and generally several of these alternatives may be feasible. Our program will use the expressed preferences of the job request submitter to generate alternatives in a preferred order, and will select the first feasible alternative found.

The simplest step in generating alternatives is to try all combinations of acceptable configurations, acceptable times, and eligible equipment to see if the job, J, will fit at any acceptable place in the existing schedule. This can be done quickly and accurately by the computer by calling subroutine INSERT for each acceptable combination of time and configuration. Arranging the trials in preference order on configurations and times will guarantee that the first feasible combination found is the best possible.

A more complicated set of alternatives arises when we consider modifying the existing schedule to make room for the new job. One way of doing this is to (temporarily) remove an already scheduled job K from the schedule. If this makes enough room to schedule job J, then we hope to find room elsewhere for job K. If job J still doesn't fit, then a different K can be tried. If eventually a K is found such that both jobs fit back into the schedule, then the modification has been successful. If no such K is found, then since J is lower in the processing sequence then any already scheduled job K, J must be left unscheduled or we must try some other alternatives.

Other more complex schedule modifications can be imagined, for example,

a) Move two adjacent jobs K and L to make room for job J and then try to put K and L back into the schedule elsewhere

b) Move job K to make room for job J. Then move job L so K can be put back into the schedule. Finally try to put L back into the schedule elsewhere.

2. Flowchart

In Figures 13, 14 and 15, we specify the decision logic for the direct scheduling (J only) and single job schedule modification (J&K) discussed above. The logic could easily be expanded to incorporate other alternatives.

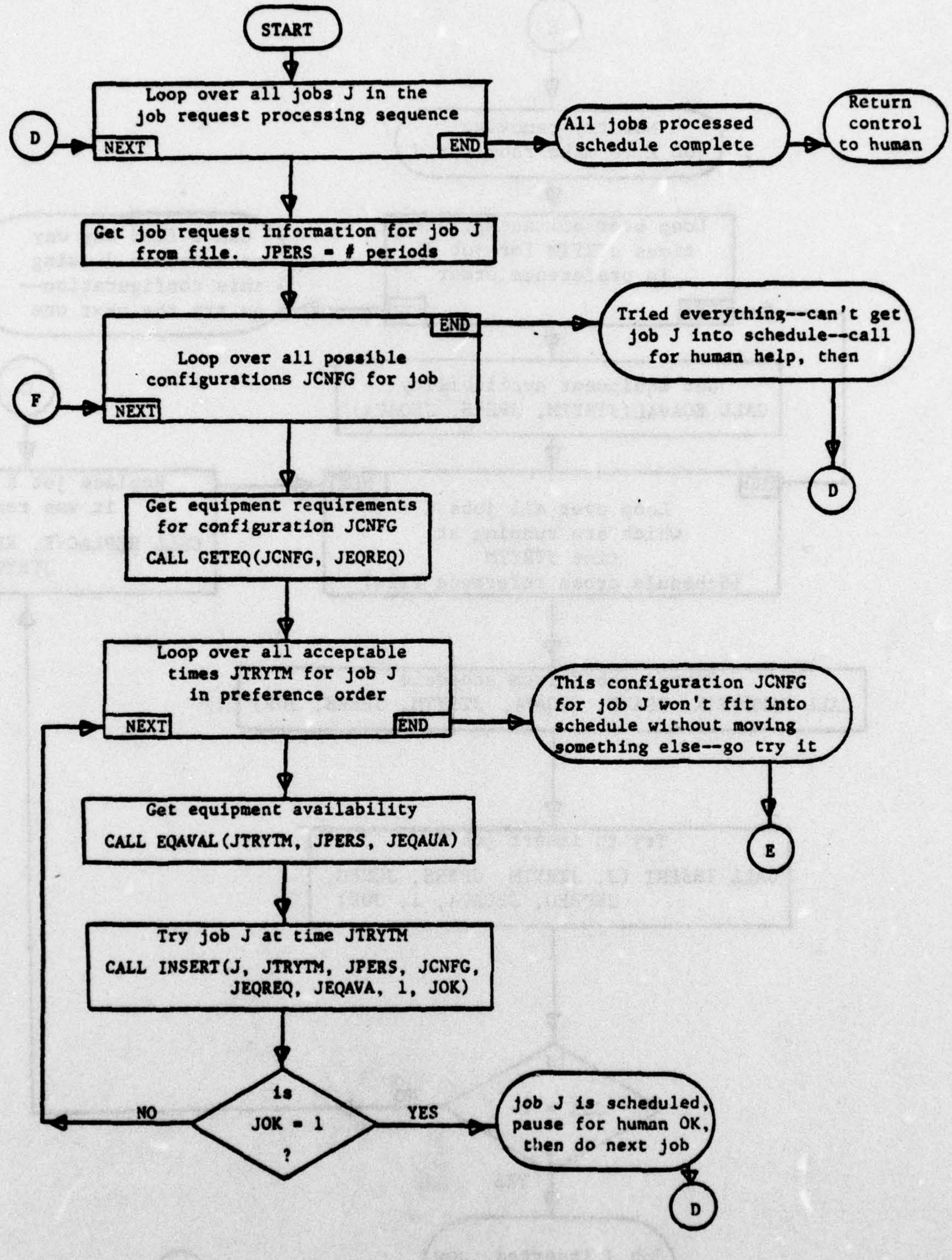

Figure 13. SCHEDULER

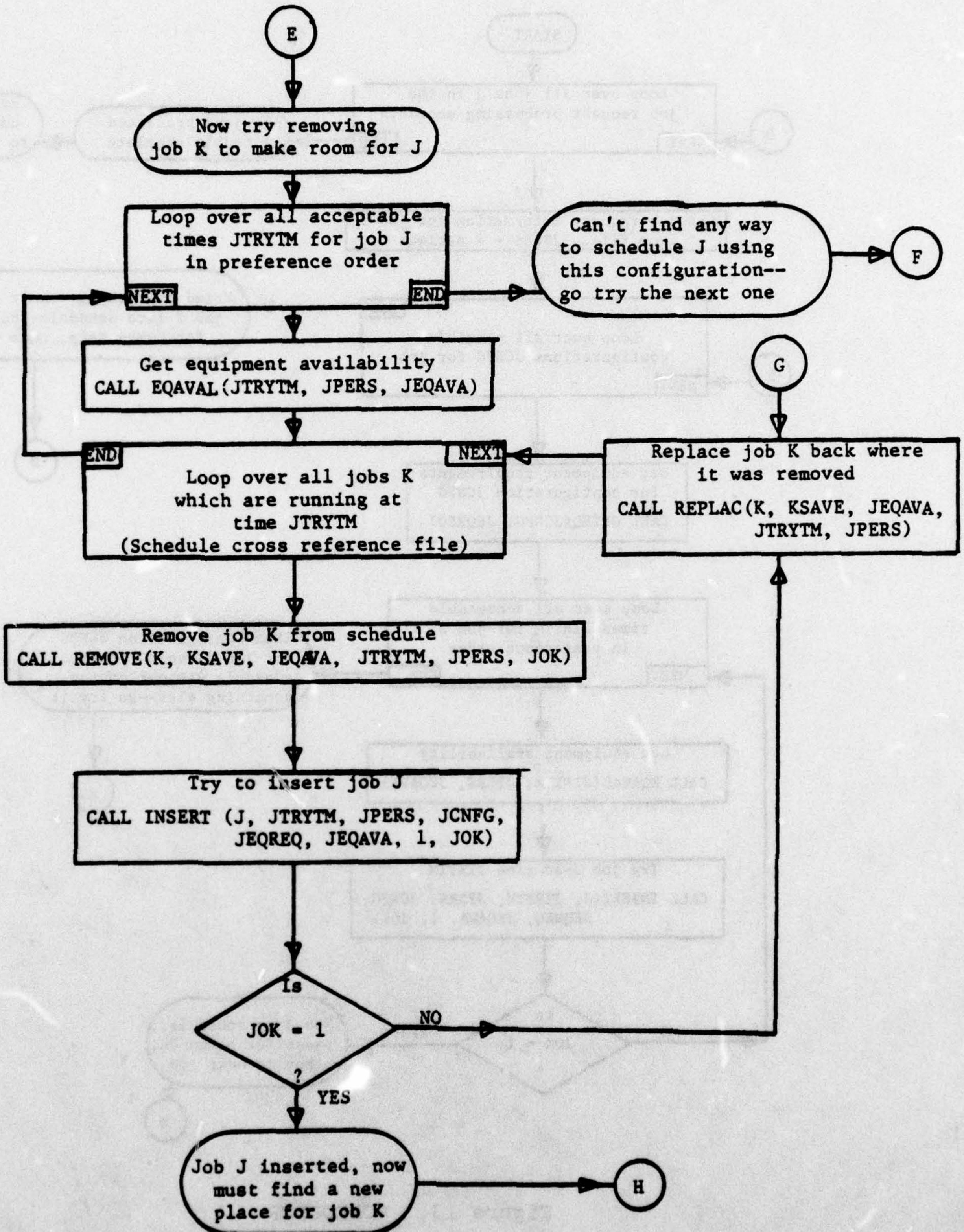

Figure 13. SCHEDULER (continued)

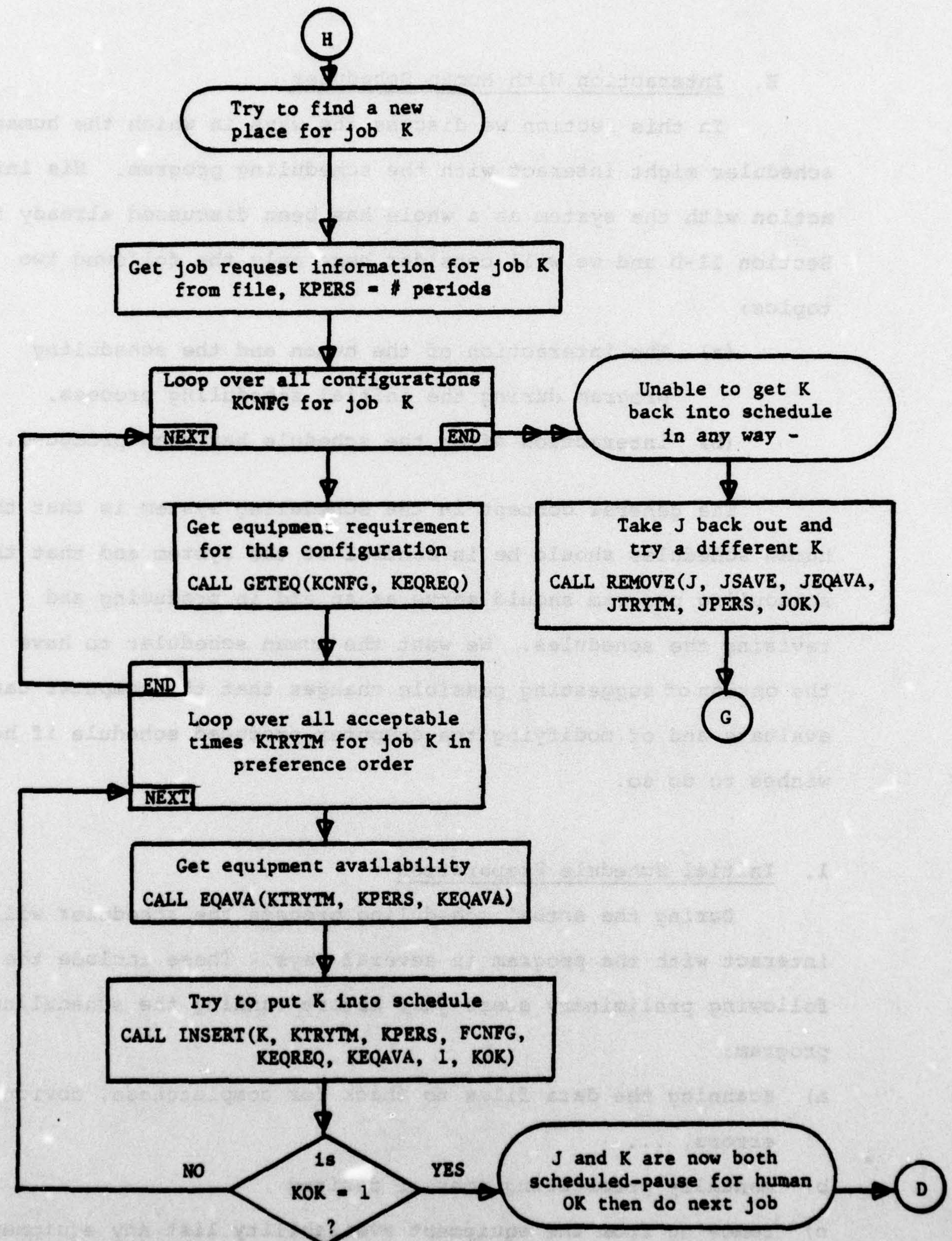

FIGURE 13. SCHEDULER (continued)

E. Interaction With Human Scheduler

In this section we discuss the ways in which the human scheduler might interact with the scheduling program. His interaction with the system as a whole has been discussed already in Section II-D and we will consider here only the followng two topics:

(a) The interaction of the human and the scheduling program during the initial scheduling process,

(b) interaction after the schedule has been produced.

The general concept in the scheduling system is that the human scheduler should be in control of the system and that the scheduling program should serve as an aid in producing and revising the schedules. We want the human scheduler to have the option of suggesting possible changes that the computer can evaluate and of modifying the computer produced schedule if he wishes to do so.

1. Initial Schedule Preparation

During the actual scheduling process the scheduler will interact with the program in several ways. These include the following preliminary steps just before running the scheduling program:

a) scanning the data files to check for completeness, obvious errors, ...

b) manually preordering jobs if desired

c) removing from the equipment availability list any equipment known to be down for the next week.

We envision the program running in an interactive mode whereby the scheduler is notified when the program is unable to schedule any job, say J. Upon such notification the scheduler would have several options available, first to collect information, then to take action if desired. In a computer based system such as this we cannot expect that the scheduler will have too much insight into subtle changes that might improve the schedule. The reason for this is that the scheduler will no longer be working directly with the job requests as he does now on the scheduling board where he gains insight into possible schedule modifications. In the absence of this insight, the challenge in system design is to make the system responsive to a variety of questions he might wish to ask.

Listed below are several information requests to which the system should be responsive when queried by the scheduler. We envision that the scheduler would ask these questions before suggesting any schedule modifications to the computer program, and that asking these questions would cause no change in the existing partial schedule.

(i) Requests for information

a) Display the existing schedule:

-jobs scheduled in each time period

-equipment assigned to each job.

This request can be fulfilled simply by reading and displaying information contained in the existing schedule files.

b) Display job request information for job J including:

-identification

-sequence number

-configuration(s) requested

-times requested

-number of hours requested

This request can also be satisfied by displaying information contained in existing files.

c) List all times when job J could be scheduled without deleting jobs already scheduled. (Assuming that an attempt has already been made to schedule job J, these times must be currently designated as unacceptable for J or else the job would already have been scheduled.)

This request would be satisfied by calling on the subroutine INSERT and simply noting whether the variable JOK in that routine is 0 (job cannot be inserted) or 1 (job can be inserted). A provision would have to be made in INSERT to prevent its changing variables when JOK = 1 since this is an information request only. The variable JACTN = 0 serves this purpose.

d) What equipment shortage prevents job J from being scheduled beginning at time t, and what other jobs are assigned equipment of that type at the same time?

This information can be obtained from INSERT since if INSERT fails it is because an equipment shortage has been identified. A provision would be necessary to record all shortages instead of simply exiting from INSERT when the first shortage is identified.

The system's response to item (b) might indicate some currently unacceptable times at which job J could be scheduled. The scheduler could contact that programmer and determine if any of those times could be used. If so, job J could be scheduled. If not, more subtle changes will have to be made or else job J will remain unscheduled.

The system's response to (c) will inform the scheduler regarding conflicts which prevent job J from being inserted at its requested times. If sufficient reason exists for doing so, the scheduler might later force job J into the schedule and a conflicting job, say K, out. Notice that if this is done, it will be impossible to find an acceptable time for job K without further schedule changes since all such interchanges between J and K would already have been tried by the scheduling program. What has not been tried is removing two jobs simultaneously, say K and L and then trying to reinsert them elsewhere although

this option could easily be included in the scheduling program.

After asking any of these questions the scheduler should have available the following alternatives.

(ii) Requests for action

a) do nothing and let the program continue,

b) extend the list of acceptable times for any job,

c) specify alternate configurations for any job,

d) reorder the job processing sequence

e) initiate a new run (after b, c, or d),

f) force job J into the schedule at time t and remove other specified jobs. (The program would determine which jobs to remove if job J were moved to the top of the processing list and a new run initiated.)

If the scheduler chooses not to intervene during the scheduling process he would still have the above options available upon completion of the computer run. Of course, in this case if all the jobs were successfully scheduled as requested he would probably make no changes, but if some jobs are not scheduled the scheduler would probably want to try some alternatives to see if the remaining jobs can somehow be inserted into the schedule.

2. <u>Schedule Revision</u>

After the schedule is completed and published there are severai events that would necessitate a change in it. These include:

a) the unanticipated arrival of an urgent job whose priority demands that it be scheduled at a certain time;

b) equipment breakdown;

c) a job withdrawal.

While the first of these events should be very rare, its occurrence will cause concellation of some job or jobs. Such jobs will normally be treated as new arrivals and placed in the pending request file if no alternate time is found. However, if the scheduler chooses to do so, he can insert the displaced job in any new time period he desires. This action can cause further displacements and such cascading should not be allowed to propagate too far since it would be very disruptive.

The breakdown of any scheduled equipment near to run time will cause the cancellation of some job unless a reassignment of equipment is possible. If this is not possible and cancellation occurs, the scheduler should be able to use the scheduling program to search for alternative times in which the cancelled job could be scheduled. The cancelled job would be treated as a new request and would remain in the PENDING REQUEST file if no time is found for it. In exceptional cases, it could be rescheduled at the expense of other jobs.

Whenever a job is cancelled or voluntarily withdrawn from the schedule there is a possibility that some job in the PENDING REQUEST file can then be scheduled. The search through the PENDING REQUEST file for such a job could be initiated automatically or by a request from the scheduler.

V. DESCRIPTION OF PROGRAM AND RESULTS

In this chapter we discuss the FORTRAN program which was written to test the scheduling method proposed in this report. This program was designed only as a test mechanism and is not intended for implementation in its current form although it should serve as a useful model from which a final version can be prepared.

The overall logic of the program has already been discussed in Chapter IV and in this chapter we will confine our attention to a discussion of how this version differs from the version intended for implementation, a description of the data arrays used in this program, and the input required.

The scheduling method was tested by obtaining a typical week's scheduling requests from FCDSSA (week of 1 Nov. 76) and producing a schedule from them. In this chapter we also describe how the FCDSSA data was translated into a suitable input format for the program, and we will describe briefly the results of that experiment.

A. Differences Between the Test Program and A Version for Implementation

The test program described here differs from the version envisioned for implementation in the following ways:

a) the test program was written as a stand-alone program residing entirely in core memory.

b) The program is not interactive, thus no provision has been made for the scheduler to obtain information from it of the type discussed in Chapter IV, Section E and no way is provided for him to influence the schedule produced. The variable JACTN is not included in the test program.

c) The data files described in Chapter III of this report were replaced in this program by data arrays in core.

d) The test program assigns specific equipment only for MTU's, TTY's, and CPU's. The other types of equipment are not assigned to specifically identify individual pieces of equipment. Each type is simply allocated on the basis of numerical availability without regard for its specific ID or location.

B. Description of Test Program Data Arrays

Listed below are the data arrays used in the test program and a description of their contents.

The arrays occurring in MAIN are:

1. IEQ4JB (200,40): This array called "equipment for job" allows space for 200 jobs and twenty types of equipment. For each job, the entries in that row are in pairs:

   ...[equip ID, number of pieces] ....20 pairs.

   The entry specifies the ID number for some equipment as well as the number of pieces of that equipment assigned to this job. The information here corresponds to item p of the Current Week File in Chapter III.

2. ITM4JB (200,2): This array is called "time for job" and contains for each job start time assigned to the job and the number of periods occupied by the job. This information would be contained in the Current Week File described in Chapter III.

3. JB4TM (42,20): The "job for time" array contains 42 rows, one for each time period. In each row the 20 elements are job ID's corresponding to jobs scheduled at that time. A job ID will appear if the job is scheduled to begin at that time or if the job began earlier but overlaps into that time. This corresponds to the Schedule Cross Reference File of Chapter III.

4. NEQUIP (60): The "number of equipment" array contain the total number of pieces of equipment available for each of 60 distinct types. This corresponds to the Equipment File described in Chapter III.

5. IEQ4CG (60,40): This array "equipment for configuration" contains the definition of the equipment configuration for as many as 60 configurations. The data elements for each configuration are in pairs:

...[equip ID, number of pieces] .....

The dimension 40 allows for as many as twenty pairs or twenty equipment types. This information corresponds to that in the Configuration File of Chapter III.

6. ISP4JB (200,49): The "specific equipment for job" array contains space for the ID's of the specific equipment assigned to each of 200 jobs. The test program assigns only TTY, MTU and CPU equipment by specific identifier. There are 49 such pieces of equipment. The assignment of specific equipment ID's was a feature added after the basic version of the scheduling program was completed. In the basic version equipment was allocated only the basis of numerical availability . This corresponds to item p of the Current Week File of Chapter III.

7. JBINFO (200,10): This array contains job information for each of 200 jobs. The information is:

   1. JSEQ, job sequence number.
   2. JNAME alpha job name.
   3. NCNFG, number of acceptable configurations for this job.
   4. JHRS, number of hours requested
   5. JNTM1, number of acceptable start times.
   6. Not used
   7.-10. Configuration numbers for this job listed in preference order.

   This information corresponds to that in the Pending Weekly Request File of Chapter III.

8. JBTIME (200,42): The "job time" array gives the ordered list of as many as 42 acceptable times listed in preference order for each of 200 jobs. The number of entries is JNTM1.

   This information is the same as item ℓ of the Pending Weekly Request file of Chapter III.

9. NCFG (200): An array used only to store configuration numbers for later printing. The j^{th} element is the configuration number used when scheduling job J. Corresponds to the information in g of the Pending Weekly Request File of Chapter III.

10. JEQAVA (60,4): This array called "J equipment available" records the number of pieces of equipment available for each of the 60 types for the next four time periods beginning at the time period currently under consideration for job J.

11. JEQREQ (40): For the job designated J the "J equipment required" array stores up to 20 pairs of

...[equip ID, number required] ...

12. KEQAVA (60,4): Similar to JEQAUA.

13. KEQREQ (40): Similar to JEQREQ.

14. JSPAVA (60,4): This array records the specific equipment available for each of 60 types and four time periods.

15. KSPAVA: Similar to JSPAVA

16. JSAVE (91): This is a temporary array used to store information about the scheduling arrangements for job J. The array is used when job J is temporarily withdrawn from the schedule. If replacement is required it can be done quickly using JSAVE. The information is

1. The scheduled time.
2. The number of periods affected.
3. 20 pairs of [equip ID, Number assigned].
4. 49 numbers requesting the ID's of the specific equipment assigned to job J.

17. KSAVE (91): Similar to JSAVE.

18. JTIMS (42); The "J times" array holds the acceptable times for the current job, job J, in preference order. The data contained here duplicates the information contained in one row of JBTIME. The original concept was that information

on all the jobs would be stored peripherally (JBTIME) and the data for the current job would be brought into core as needed (JTIM).

19. KTIM (42): Similar to JTIM.

The arrays occurring only in the subroutine SPECIF are:

1. LOOK (17): This array is used as an address array. It stores an address which tells where to begin looking in the ISPEC array for the ID's of singles, pairs, triples and quadruples of CPU's.

2. ISPEC (776): The locations of the CPU's available in C&S 1 and C&S 2 were examined and groups of compatible CPU's for type A and B computers were identified. The ID members for groups of 1, 2, 3, 4 were listed in the array ISPEC in decreasing order of desirability beginning with C&S 2A. Following that were the lists for C&S 2B C&S 1A and C&S 1B computers. If more than four CPU's are needed, their ID's are found by looking through the list of single CPU's until the correct number of available units is found. If the desired number is not available, the job is not scheduled.

3. ISPTTY (24,8): This array holds the specific teletype ID's which are desirable for use with each CPU. For each of the 24 CPU's this array contains as many as eight ID's corresponding to compatible TTY's listed in descending order of desirability.

4. ISPMTU (24, 8): Similar to ISPTTY except this array holds MTU ID's.

5. NCPU (2): This array holds the ID for a CPU specifically assigned in C&S 1 or C&S 2 for the job currently under consideration. It is used to reference the arrays ISPTTY and ISPMTU.

C. <u>Description of Time Periods in Scheduling Program</u>

The test version of the scheduling program described here assumes that the scheduling week is divided into 42 time periods. Each day is divided into six periods whose boundaries are the times: 0000, 0400, 0700, 1200, 1600, 2000, 0000 . Period 1 is Monday from 0000 to 0400, and they are numbered consecutively thereafter.

The subroutine PERIOD is called for each scheduling request to determine the number of periods which that job will overlap if it begins at the time currently being requested and continues for the number of hours required. The subroutine assumes the number of periods affected is four or fewer.

D. Input Data Required for Scheduling Program

The input data required for the scheduling program is described in general terms in this section. The exact data formats can be determined by examining the program listing.

For each job the following information is required:

a) A unique ID number $\leq$ 200. The program currently processes the jobs in the order input, but provision is made in the program (see comments) for other orderings if desired.

b) A job name.

c) The number of acceptable configurations $\leq$ 4.

d) The number of hours requested.

e) The number of acceptable times $\leq$ 42.

f) A list of the acceptable configurative numbers.

g) An ordered list of acceptable times.

In addition to the data for the individual jobs, the data describing the configurations must be available. This includes:

a) The number of configurations

b) (equip ID, number) in pairs for each configuration. Up to 20 pairs are allowed.

Date describing the equipment available must be available including:

a) The number of equipment types.

b) The number of pieces available for each type.

The existing test program handles only three specific types of equipment TTY's, MTU's and CPU's. Data is required (in subroutine SPECIF) regarding the preference order in which these pieces of equipment are assigned. This data is currently read in as a BLOCK DATA subroutine.

Section V-F describes the method of assigning specific equipment.

E. Description of Test Problem

Data for a typical week's scheduling requests (1 Nov 1976) was obtained from FCDSSA and prepared as input to the test program.

The first step was to assign a specific ID number to each piece of equipment that is involved in the schedule. Table 1 shows the ID numbers assigned.

The next task was to translate the individual job requests into the required input format. The result of this can be seen most easily by looking at the output section of the computer program, but some explanation is needed. For example, job number 1 was a maintenance job requesting one configuration, seven hours at one acceptable time. It requested configurations 3 and time 1. Jobs 2-5 were also maintenance jobs.

Some guesswork was necessary in translating the job requests since we are not familiar with the needs of the individual programmers. For example, the request from ASIS-05 was interpreted

TABLE 1. Equipment Numbers as Used in Test Program

EQUIP #	NAME	AVAIL
1	Computer A C&S 2 (α's)	7
2	Computer B C&S 2 (α's)	7
3	Computer A C&S 1 (#s)	5
4	Computer B C&S 1 (#s)	6
5	Mag Tape RD-243	10
6	Mag Tape RD-294	2
7	Mag Tape RD-281	4
8	Mock-up NTDS 1	1
9	Mock-up NTDS 2	1
10	Mock-up NTDS 3	1
11	Mock-up NTDS 4	1
12	Mock-up NTDS 4a	1
13	Mock-up NTDS 5	1
14	Mock-up NTDS 6	1
15	Mock-up NTDS 7	1
16	Mock-up NTDS 7a	1
17	Mock-up NTDS 8	1
18	Mock-up PC E	1
19	CATCC1	1
20	ATDS 1,2	1
21	ASIS 1	1
22	DD963	1
23	Ref Mem Unit	6
24	Simulators EW1	1
25	Simulators LMS	1
26	Simulators SM 319 (1-5)	5
27	Simulators SM 319 (6-10)	5
28	Simulators SM 319 (11,12)	2
29	Simulators 441 (13-19)	7

Table 1. Continued.

#	NAME	AVAIL
30	Comm. USQ - 59 (1)	1
31	Comm. USQ - 59 (2)	1
32	Comm. USQ - 36 (3)	1
33	Comm. USQ - 36 (4)	1
34	Comm. SSQ - 29 (5)	1
35	Comm. SSQ - 29 (6)	1
36	Comm. CP - 800	1
37	Comm. SSW - 1A, 1C	2
38	Comm. KG 22	1
39	Radar, Live	1
40	Perif: Vid Proc	1
41	MK 9/11	1
42	WCP	1
43	BUP	1
44	KCMX	4
45	PES( )	7
46	PES( )	9
47	KSC	5
48	RO-280	3
49	1532/1232	1
50	RP-161	1
51	ECMU	5
52	Additional UYK-7	1
53	UYK-20	6
54	UYA-5	1
55	TTY	20
56	DUMMY (ASIS-05)	1

as a request for seven blocks of four hours each at any of 10 times. This was broken into seven separate requests (numbered 52-58) and to prevent any two from occurring simultaneously we defined a dummy piece of equipment (#56, one available), needed by each job. Other requests were also broken into several separate requests. Jobs 66 and 67 are both named SAIL and indicate that four hours is requested Tuesday or Wednesday afternoon <u>and</u> four hours on Thursday or Friday.

Associated with each of these job requests is a configuration number. The configurations are defined in the data input and are printed out for easy reference.

F. Assignment of Specific Equipment

The initial version of this test program assigned equipment to jobs on the basis of numerical (and temporal) availability only. The modified version, discussed in this chapter, goes one step farther and deals with individual pieces of equipment when assigning CPU's, TTY's and MTU's. This section discusses the method used in assigning this specific equipment.

The reason for dealing with specific equipment in these three categories is that not all possible configuration are spatially convenient and it is necessary to select groups of equipment which will be acceptable to the users. For the other types of equipment, spatial location is not as critical and that

equipment is not dealt with in the same detail as CPU's, TTY's and MTU's. When the schedule is published, or at least when the equipment is hooked-up, it will be necessary to select specific prices of equipment for assignment to the individual jobs. If any of the other equipment is critical because of its compatibility or incompatibility with other equipment, it can be assigned by the scheduling program in the same way CPU's, TTY's and MTU's are assigned. But if no constraints exist of the compatibility of other equipment, any piece will do, and it is unnecessary to go to additional effort to select it during the scheduling process.

When dealing with a job, say job J, the program first gets the basic data for that job. This includes the times and configuration(s) requested by the job and its duration. The first step is to call the subroutine GETEQ and examine the configuration file to determine the type and quantity of equipment requested. Next the subroutine PERIOD is called to compute the number of periods which would be affected by this job if it is assigned to the starting time currently being considered. The subroutine EQAVAL determines the total amount of equipment available in each of the periods (up to 4) affected by the job and plans in the results in the arrays JEQAVA and JSPAVA. When INSERT is called a comparison is made to determine if enough equipment is available to accommodate this job. This check is on the basis of numerical availability only. If this test fails, the program moves to the next time, configuration or job. If

successful, a check must still be made on the availability of compatible CPU's, TTY's and MTU's. This is done in subroutine SPECIFIC.

SPECIFIC first examines the CPU's (equipment ID numbers 1, 2, 3 and 4). Suppose 3 C&S 2A computers are required. The array LOOK is used to store an address in the array ISPEC where a list of compatible triples of C&S 2A computers begins. The array ISPEC is accessed at that point and if the first three C&S 2A computers are available, they are assigned by changing the array ISP4JB. If not, the next three on the list are examined.

Assuming the desired number of CPU's is available in an acceptable group, the program goes on to examine TYY's and MTU's. If no acceptable group of CPU's is found the program returns to INSERT then to MAIN to try the next time, configuration, or job. No attempt is made to rearrange existing assignments of specific equipment even though we know adequate numbers of CPU's are available or we would not have entered SPECIF.

All the CPU's in C&S 1 and C&S 2 were examined in preparing the lists of single, doubles, triples, and quadruples appearing in the array ISPEC. Personnel at FCDSSA should examine these lists to determine if the preference ordering we assigned is suitable from the user's point of view. This data appears in the program listing as BLOCK DATA called ISPEC. The beginning address in ISPEC for various groups can be found in LOOK as shown below in Table 2.

Table 2. Correspondence between Addresses in ISPEC and groups of computers.

(Address in ISPEC)-1	Type	Number of Computers
LOOK(1) = 0	C&S 2A	1 (singles)
(2) = 7	C&S 2A	2 (doubles)
(3) = 49	C&S 2A	3 (triples)
(4) = 154	C&S 2A	4 (quadruples)
(5) = 294	C&S 2B	1 (singles)
(6) = 301	C&S 2B	2 (doubles)
(7) = 343	C&S 2B	3 (triples)
(8) = 448	C&S 2B	4 (quadruples)
(9) = 588	C&S 1A	1 (singles)
(10) = 592	C&S 1A	2 (doubles)
(11) = 604	C&S 1A	3 (triples)
(12) = 616	C&S 1A	4 (quadruples)
(13) = 620	C&S 1B	1 (singles)
(14) = 626	C&S 1B	2 (doubles)
(15) = 656	C&S 1B	3 (triples)
(16) = 716	C&S 1B	4 (quadruples)
(17) = 776	dummy address	

AD-A050 220   NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF   F/G 17/2
NTDS COMPUTER FACILITIES SCHEDULING SYSTEM--FINAL REPORT. (U)
DEC 77 J K HARTMAN, G T HOWARD
UNCLASSIFIED   NPS55-77-45   NL

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If more than four computers are required, the subroutine abandons the idea of selecting compatible groups and simply reads down the list of singles until an adequate number of CPU's is found.

When assigning specific TTY's and MTU's the program begins by referencing a CPU already assigned (if any) and selects TTY's or MTU's compatible with that CPU. This is done for TTY's by reading in the array ISPTTY where for each CPU there is listed, in decreasing order of desirability, the acceptable TTY units. For MTU's the list is found in ISPMTU. In each case,assuming adequate numbers of TTY's and MTU's are found, they are assigned to the current job. If it is found that insufficient TTY's or MTU's are available, the program deletes all previously assigned equipment (e.g. CPU's) before returning to INSERT with a failure indication, JOK = 0.

G. Summary of Results from Test Problems

The results of the test problem can be clearly seen by examining the computer output in Appendix A.

Ninety-one jobs were examined, 173 individual attempts at job insertion were made; 54 of these were attempts at replacing a job (K) when temporarily displaced by another job (J) lower on the processing list. In the course of the scheduling, 78 job removals were attempted. Of the ninety-one jobs only four were

left unscheduled. Three of these had allowed only one acceptable time which conflicted with another job requesting some of the same equipment. No amount of shuffling would have found a feasible solution. It is in this kind of situation that the human scheduler could use his knowledge of the programmer's needs to extend the list of acceptable job times,to modify the configuration, reduce the duration requested, or make some other accommodation. The other unscheduled job had specified three acceptable times and the reasons it remained unscheduled are a little more subtle, but again the human, if presented with the appropriate information, might be able to resolve the problem.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Summary

In this report we have presented the design for an interactive scheduling program as a part of an overall system, which includes NTDS equipment status reporting, equipment scheduling, and, eventually, automatic hookup via the High Speed Digital Switch. This design includes file definitions, proposals for file management, program modules, and detailed flowcharts for the decision logic in the crucial scheduling module.

In addition, a prototype scheduling program has been written using the proposed design and tested on the actual job requests for a typical week. The results indicate that a stand-alone computer program can do a good job of scheduling, and we anticipate that the addition of an interactive capability would allow the human scheduler to further improve these results using the scheduling program.

B. Major Tasks Remaining Before Implementation

Several steps are required to implement the automatic scheduling system described here. The steps presented are arranged to minimize the impact on the users and will cause very little change in their routines until a workable system can be demonstrated.

The major steps required are:

1. Define and establish the configuration file.
2. Modify the job request format so that users specify their requests in terms of

   -configuration numbers

   -preferred times.
3. Concurrent with Steps 1 and 2, program and debug a useable version of the scheduling program.
4. Upon the completion of Steps 1 and 2, the user's requests are coming to the schedule with the appropriate information for input to the scheduling program. The information must be input into the SCHEDULE REQUEST FILE for use by the scheduling program.

   The actual scheduling process is of no importance to the user and the transition from manual scheduling to the scheduling program can be made at this point without affecting the user. Any difficulties which arise are the concern of the schedule not the users. In this sense any problems are confined and will not cause widespread disruption in FCDSSA.
5. Make any necessary modifications to the scheduling program based on the experience gained in Step 4.
6. Expand the system to allow users to input directly to SCHEDULE REQUEST file and to interrogate the system for scheduling information.
7. Incorporate maintenance information via the EQUIPMENT file into the scheduling system.
8. Interconnect the scheduling system with HSDS.

APPENDIX A

EQUIPMENT SCHEDULING PROGRAM

```
      DIMENSION IEQ4JB(200,40),ITM4JB(200,2),JB4TM(42,20),NECLIF(60)
      DIMENSION IEQ4CG(60,40),ISP4JB(200,45)
      DIMENSION JBINFC(200,10),JPTIME(200,42),NCFG(200)
      DIMENSION JEQAVA(60,4),JEQREQ(40)
      DIMENSION KEQAVA(60,4),KEQREQ(40)
      DIMENSION JSPAVA(60,4),KSPAVA(60,4)
      DIMENSION JSAVE(91),KSAVE(91)
      DIMENSION JTIMS(42),KTIMS(42)
      DIMENSION JNEXT(200)
      COMMON IEQ4JB,ITM4JB,JB4TM,NEQUIP, IEQ4CG
      COMMON NTYPE,NSP,ISP4JB
C
C
C
C           DESCRIPTION OF DATA INPUT
C
C
C           NBRCFG                                 (1CARD)             I5
C           EQUIP ID, NBR......(IN PAIRS)          (NBRCFG CARDS)      40I2
C
C
C           NTYPE   NSP                            (1 CARD)            2I5
C           NEQUIP......FOR EACH TYPE              (1 CARD)            40I2
C
C
C           JMAX                                   (1CARD)             I5
C                   JSEQ,JNAME,NCNFG,JHRS,JNTM1    (JMAX CARDS)        I5,A5,3I5
C                   EACH OF THESE CARDS IS FOLLOWED BY THE
C                   NEXT  2  TYPES OF CARDS IF APPROPRIATE
C                   (1) CONFIG NUMBERS             (1 CARD)            40I2
C                   (2) PREFERRED TIMES            (0,1,2,3CARDS)      40I2
C
C
C  READ IN DATA TO DEFINE CONFIGURATION FILE
C  READ NUMBER OF CONFIGURATIONS UP TO 50
      READ (5,1000) NBRCFG
      WRITE (6,1001) NBRCFG
 1001 FORMAT(' NBRCFG=',I5)
C  READ CONFIGURATION DATA. EQUIP ID - NUMBER PIECES REQUIRED UP TO 20 PAIRS
      DO 11 I=1,NBRCFG
      READ (5,5000) (IEQ4CG(I,J),J=1,40)
 5000 FORMAT (40I2)
      WRITE (6,5002) I
 5002 FORMAT ('0CNFG=',I3)
      WRITE (6,5001)(IEQ4CG(I,J),J=1,39,2)
 5001 FORMAT ('    EQ TYPE',20I5)
      WRITE (6,5003)(IEQ4CG(I,J),J=2,40,2)
 5003 FORMAT ('    NUMBER ',20I5)
   11 CONTINUE
C  READ IN DATA FOR EQUIP AVAILABLE
C  WE ALLOW 60 EQUIP TYPES
      READ (5,1000) NTYPE,NSP
      WRITE(6,1002) NTYPE,NSP
 1002 FORMAT(/////' NTYPE=',I2,' NSP=',I2)
      READ (5,5000) (NEQUIP(J),J=1,NTYPE)
C  INITIALIZE NEQUIP
      IFILL=NTYPE+1
      IF(IFILL.GT.51) GO TO 72
      DO 71 II=IFILL,60
      NEQUIP(II)=0
   71 CONTINUE
   72 CONTINUE
      WRITE (6,1003)
 1003 FORMAT(' NUMBER OF PIECES OF EQUIPMENT AVAILABLE')
      WRITE (6,1013)(J,J=1,NTYPE)
 1013 FORMAT(' TYPE   ',4I2,I3,53I2,I3,I2)
      WRITE (6,1023)(NEQUIP(J),J=1,NTYPE)
 1023 FORMAT (' NMBR   ',4I2,I3,53I2,I3,I2)
C  WE NEED TO CHECK IF THE EQUIP REFERENCED IN CONFIG FILE ETC EXISTS
C  READ THE NUMBER OF JOBS IN THIS PROBLEM
      READ (5,1000) JMAX
      WRITE(6,1004) JMAX
 1004 FORMAT(/////' JMAX= ',I2)
```

```
0044      1000 FCRMAT(2I5)
          C
          C
          C  READ THE DATA FOR EACH JCB
          C  STORE IN ARRAY JBTIME(JSEC, 1 TO 42)
          C
0045           DO 1 IN=1, JMAX
0046           READ (5,2000) (JBINFC(IN,I), I=1,6)
0047      2000 FORMAT (I5,1X,A4,4I5)
0048           J3=JBINFO(IN,3)+6
0049           READ (5,5000)(JBINFO(IN,I),I=7,J3)
0050           J5=JBINFO (IN,5)
0051           READ (5,5000) (JBTIME(IN,I),I=1,J5)
0052      3000 FCRMAT (16I5)
          C
          C
          C
0053           NXXX=6+JBINFO(IN,3)
0054           WRITE(6,22)(JBINFO(IN,MM),MM=1,NXXX)
0055        22 FCRMAT('0 JSEC=',I3,'  JNAME=',A4,'  JCNFG=',I3,'  JHRS=',I3,
              1'  NBR TIMES ACCEPTABLE=',I2,'  NBR REJECTED=',I3,' CCNFIG=',4I3)
0056           NGCOD=JBINFC(IN,5)
0057           WRITE (6,7000) (JBTIME(IN,M),M=1,NGCCD)
0058      7000 FORMAT (' TIMES=',42I3)
          C
          C
0059           ITP4JB(IN,1)=0
0060           ITP4JB(IN,2)=0
0061         1 CCNTINUE
          C  THE TIMES FOR EACH JOB ARE NCW ARRANGED
0062           WRITE (6,7500)
0063      75CC FCRMAT (//'0 SUMMARY CF SCHEDULING PRCCESS'/)
          C  INITIALIZE J64TM
0064           DC 90 IX=1,42
0065           DC 80 IY=1,20
0066           J64TM(IX,IY)=0
0067        80 CCNTINUE
          C  INITIALIZE IE04JB AND  ISF4JB
0068           DC 92 IX=1,200
0069           DC 90 IY=1,40
0070           IE04JB(IX,IY)=0
0071        90 CCNTINUE
0072           DC 91 IZ=1,45
0073           ISP4JB(IX,IZ)=0
0074        91 CCNTINUE
0075        92 CCNTINUE
          C
          C  ROUTINE THAT PREORDERS JOBS....MUST FILL JNEXT(JMAX)
0076           DO 333 III=1,JMAX
0077       333 JNEXT(III)=JBINFO(III,1)
          C
          C
          C
          C
          C
          C
          C  TRY TO INSERT JOB J IN EXISTING HOLES
0078           DC 100 JJJ=1,JMAX
0079           J=JNEXT(JJJ)
0080           J3=JBINFO(J,3)
0081           DC 99 JCON=1,J3
0082           WRITE (6,1100) J
0083      1100 FCRMAT ('       WCRKING CN JOB ',I5/10X,'TRY IT IN   RESULT')
          C  GET DATA FCR JCB J
0084           DO 334 JFIND=1,JMAX
0085           IF (J.EQ.JBINFO(JFIND,1))GO TO 335
0086       334 CCNTINUE
0087       335 CONTINUE
0088              JSEC=JBINFO(JFIND,1)
0089              JNAME=JBINFC(JFIND,2)
0090              JCNFG=JBINFO(JFIND,6+JCON)
0091              JHRS=JBINFO(JFIND,4)
0092              JNTP1=JBINFO(JFIND,5)
```

```
            C  USE NCFG          TO STORE CURRENT CONFIG FOR LATER PRINTING
0093              NCFG(J)=JCNFG
0094                 DO 50 I=1,42
0095          50     JTIMS(I)=JBTIME(JFIND,I)
0096                 CALL GETEQ(JCNFG,JECREQ)
            C  TRY TIMES FOR JOB J IN ORDER
0097              DO 200 JTRY=1,JNTM1
            C
            C
            C
            C
0098              JTRYTM=JTIMS(JTRY)
0099              CALL PERIOD (JTRYTM,JFRS,JPERS)
0100              IF (JTRYTM+JPERS.GT.43) GO TO 200
0101              CALL EQAVAL (JTRYTM,JPERS,JEQAVA,JSPAVA)
0102              CALL INSERT (J,JTRYTM,JPERS,JEQAVA,JECREQ,JOK,JSPAVA)
0103              WRITE (6,1200) JTRYTM, JOK
0104        1200  FORMAT (14X,I2,8X,I1)
0105              IF (JOK.EQ.1) GO TO 100
0106         200  CONTINUE
            C  J DID NOT FIT IN ANY EXISTING HOLES
            C
            C  EXAMINE TIMES FOR JOB J AND TRY MOVING K TO ANOTHER SPOT
            C
0107              WRITE (6,1300) J
0108        1300  FORMAT (10X,'NOW TRY IN  REMOVE JOB',I4,'FIT?')
0109              DO 300 JTRY=1,JNTM1
0110              JTRYTM=JTIMS(JTRY)
0111              WRITE (6,1400) JTRYTM
0112        1400  FORMAT (15X,I2)
0113              CALL PERIOD (JTRYTM,JFRS,JPERS)
0114              CALL EQAVAL (JTRYTM,JPERS,JEQAVA,JSPAVA)
            C
            C
0115              DO 400 KTRI=1,20
0116              K=JB4TM(JTRYTM,KTRI)
0117              IF (K.EQ.0) GO TO 400
            C
0118              CALL REMOVE (K,KSAVE,JEQAVA,JTRYTM,JPERS,JSPAVA)
0119              CALL INSERT (J,JTRYTM,JPERS,JEQAVA,JECREQ,JOK,JSPAVA)
0120              WRITE (6,1500) K,JOK
0121        1500  FORMAT (25X,I2,8X,I1)
0122              IF (JOK.EQ.0) GO TO 399
0123              WRITE (6,1600) K
0124        1600  FORMAT (40X,'TRY TO REPLACE',I3/40X,'IN PERIOD     RESULT')
            C
            C  WE INSERTED J AT TIME JTRYTM
            C  WE MUST REINSERT K
            C  GET DATA FOR JOB K
0125              K3=JBINFO(K,3)
0126              DO 501 KCON=1,K3
0127              DO 434 KFIND=1,JMAX
0128              IF(K.EQ.JBINFO(KFIND,1))GO TO 435
0129         434  CONTINUE
0130         435  CONTINUE
0131                 KSEC=JBINFO(KFIND,1)
0132                 KNAME=JBINFO(KFIND,2)
0133                 KCNFG=JBINFO(KFIND,6+KCON)
0134                 KHRS=JBINFO(KFIND,4)
0135                 KNTM1=JBINFO(KFIND,5)
            C  USE NCFG          TO STORE CURRENT CONFIG FOR LATER PRINTING
0136              NCFG(K)=KCNFG
0137                 DO 60 I=1,42
0138          60     KTIMS(I)=JBTIME(KFIND,I)
0139                 CALL GETEQ (KCNFG,KECREC)
            C  TRY TIMES FOR JOB K
0140              DO 500 KTRY=1,KNTM1
0141              KTRYTM=KTIMS(KTRY)
0142              CALL PERIOD (KTRYTM,KFRS,KPERS)
0143              IF (KTRYTM+KPERS.GT.43) GO TO 500
0144              CALL EQAVAL (KTRYTM,KPERS,KEQAVA,KSPAVA)
0145              CALL INSERT (K,KTRYTM,KPERS,KEQAVA,KECREQ,KOK,KSPAVA)
0146              WRITE (6,1700) KTRYTM,KOK
```

```
0147        1700 FORMAT (45X,I2,8X,I1)
0148             IF (KCK.EQ.1) GC TO 1CC
0149         50C CCNTINUE
           C  WE CCULC NOT FIT K ANYWHERE WITH THIS CCNFIG, TRY NEXT
0150         501 CONTINUE
0151             CALL REMOVE (J,JSAVE,JEQAVA,JTRYTM,JPERS,JSPAVA)
0152         359 CALL REPLAC  (K,KSAVE,JEQAVA,JTRYTM,JPERS,JSPAVA)
0153         400 CONTINUE
           C  COULC NCT FIT J IN AND THEN K FOR ANY K IN THIS PERICD.
           C  TRY NEXT TIME FOR J
0154         300 CCNTINUE
           C  CAN NCT FIT J IN AND THEN K. WE TRIED ALL ACCEPTABLE TIMES FCR J
           C  TRY NEXT CCNFIG FCR J
0155          99 CCNTINUE
           C  GO TC NEXT JOB
0156         100 CCNTINUE
0157             WRITE (6,9993)
0158        9993 FORMAT ('1JOBS SCHEDULED IN EACH PERICC'//' TIME       JCBS')
0159             WRITE (6,9994)(I,(JB4TM(I,J),J=1,20),I=1,42)
0160        9994 FORMAT (21I5)
0161             WRITE(6,8880)
0162        8880 FORMAT('1',20X,'SCHEDULE SUMMARY BY JCB')
           C  NNOTIN IS THE NBR CF JOBS NCT IN SCHED
0163             NNOTIN=0
0164             DC 8881 J=1,JMAX
0165             WRITE(6,8882) J
0166             IF (ITM4JB(J,1).NE.0) GO TO 7778
0167             NNOTIN=NNOTIN+1
0168             JNEXT(NNOTIN)=J
0169        8882 FORMAT(/////' JCB NUMBER',I4)
0170             WRITE (6,7777)
0171        7777 FORMAT (11X,'NOT SCHEDULED  *********************')
0172        7778 CCNTINUE
0173             WRITE (6,8883) JBINFO(J,2),ITM4JB(J,1),ITM4JB(J,2),NCFG(J)
0174        8883 FORMAT(11X,'JOB NAME=  ',A4/11X,'START TIME=',I4/11X,
                1'NBR CF PERS=',I3/11X,'CCNFIG NBR=',I3)
0175             DO 8884 N=1,NSP
0176        8884 JSAVE(N)=0
0177             DC 8885 N=1,49
0178             IF(ISP4JB(J,N).EQ.0) GC TO 8885
0179             JSAVE(ISP4JB(J,N))=1
0180        8885 CCNTINUE
0181             WRITE (6,8886)
0182        8886 FORMAT (' SPECIFIC EQUIPMENT ASSIGNED')
0183             WRITE (6,8887)
0184        8887 FORMAT ('0 C&S2 TYPE A     C&S2 TYPE E       C&S1 A    C&S1 B
                1 C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY')
0185             WRITE(6,8888)
0186        8888 FORMAT('  A B C D E S N   M L K H P C R   1 7 8 9   2 3 4 5 6 10
               14 B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8 ')
0187             WRITE (6,8889)(JSAVE(N),N=1,NSP)
0188        8889 FORMAT (' ',7I2,2X,7I2,2X,4I2,2X,6I2,2X,6I2,2X,4I2,1X,6I2,1X,9I2)
0189             WRITE (6,8890)
0190        8890 FORMAT(/' OTHER EQUIPMENT')
0191             WRITE (6,8891)(IEQ4JB(J,N),N=1,39,2)
0192        8891 FORMAT ('0 TYPE',20I5)
0193             WRITE (6,8892)(IEQ4JB(J,N),N=2,40,2)
0194        8892 FORMAT(' NMBR',20I5)
0195        8881 CCNTINUE
0196             IF (NNOTIN.EQ.0) GO TC 6667
0197             WRITE (6,6666) (JNEXT(J),J=1,NNOTIN)
0198        6666 FORMAT (////' **** JOBS NCT SCHEDULED ****',30I3)
0199        6667 CCNTINUE
0200             WRITE (6,6670)
0201        6670 FORMAT (/////' EQUIPMENT AVAILABLE FCR EACH TIME PERIOD')
0202             WRITE (6,1013)(J,J=1,NTYPE)
0203             DC 6668 I=1,42
0204             CALL EQAVAL (I,1,JEQAVA,JSPAVA)
0205             WRITE (6,1024) I,(JEQAVA(K,1),K=1,NTYPE)
0206        1024 FORMAT(' TIME',5I2,I3,53I2,I3,I2)
0207        6668 CONTINUE
0208             END
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             C
             C   SUBROLTINE GETEQ(JCNFG,JEQREQ) GETS THE EQUIP SUMMARYFCR CCNFIG JCNFG FRCM TH
             C   E CONFIG FILE AND PUTS IT IN THE ARRAY JEQREQ
0001               SUBROLTINE GETEC (JCNFG,JEQREQ)
0002               DIMENSION IEQ4J2(200,40),ITM4JB(200,2),JB4TM(42,2C),NECUIP(60)
0003               CIMENSION IEC4CG(60,40),ISP4JB(200,45)
0004               DIMENSION JEQREC(40)
0005               CCMMON IEQ4JB,ITM4JB,JB4TM,NEQUIP, IEC4CG
0006               CCMMCN NTYPE,NSF,ISP4JB
0007               DC 21 I=1,39,2
0008               JEQREC(I)=IEQ4CG(JCNFG,I)
0009               JEQREC(I+1)=IEQ4CG(JCNFG,I+1)
0010            21 CCNTINUE
0011               RETURN
0012               ENC

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             C
             C   SUBRCUTINE PERIOD (JSTART,JHOURS,JPERS) ASSUMES TIMES ARE
             C   NUMBERED 12..6  CN MON 789.. ON TUESDAY ETC. PERIODS GO FROM
             C   0000 TO C400 TC 07C0 TO1200  TO 1600 TO 2CC0 TO 000C
             C   THIS ROLTINE WILL CETERMINE THE TOTAL NUMBER OF PERICDS FCR A
             C   JOB WHOSE START TIME AND DURATION ARE GIVENIN THE FIRST TWO LOCATIONS
             C   ASSUME DURATION NOT EQUAL 0, OTHERWISE JPERS = 1
0001               SUBROLTINE PERIOD(JSTART,JHOURS,JPERS)
0002               J1=JSTART
0003               J2=JHCURS
0004               JPERS=0
0005           107 INTEGER=J1-(J1/6)*6
             C  WE GET AN INTEGER 1,2,3,4,5,C
0006               JPERS=JPERS+1
0007               GC TC (101,1C2,103), INTGER
             C  OUTSICE RANGE WE CCNTINUE
0008           101 J2=J2-4
0009               GO TO 105
0010           102 J2=J2-3
0011               GC TC 105
0012           103 J2=J2-5
0013           105 IF (J2.LE.0) GO TO 106
0014               J1=J1+1
0015               GO TO 107
0016           106 CCNTINUE
0017               RETURN
0018               ENC
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              C
              C   SUBROUTINE EQAVAL               COMPUTES THE AVAILABLE EQUIP
              C   FOR JPERS TIME PERIODS STARTING AT JTIM AND LEAVES THE RESULTS IN JEQAVA
              C   AND JSPAVA.
              C   NOTE JPERS MUST BE .LE.4 OR ROUTINE SETS IT TO 4
              C
 0001               SUBROUTINE EQAVAL(JTIM,JPERS,JEQAVA,JSPAVA)
 0002               DIMENSION IEQ4JB(200,40),ITM4JB(200,2),JB4TM(42,20),NEQUIP(60)
 0003               DIMENSION IEQ4CG(60,40),ISP4JB(200,45)
 0004               DIMENSION JEQAVA(60,4),JSPAVA(60,4)
 0005               COMMON IEQ4JB,ITM4JB,JB4TM,NEQUIP, IEQ4CG
 0006               COMMON NTYPE,NSP,ISP4JB
              C   INITIALIZE JEQAVA TO TOTAL EQUIP AVAILABLE WITH NO JOBS SCHEDULED
 0007               IF (JPERS.GT.4) JPERS=4
 0008               DO 100 I=1,NTYPE
 0009               N=NEQUIP(I)
 0010               DO 100 J=1,JPERS
 0011           100 JEQAVA(I,J)=N
              C   INITIALIZE JSPAVA, NSP IS THE NUMBER OF SPECIFIC TYPES TO CONSIDER
 0012               DO 200 I=1,NSP
 0013               DO 250 J=1,JPERS
              C   JSPAVA=1 MEANS AVAILABLE
 0014               JSPAVA(I,J)=1
 0015           250 CONTINUE
 0016           200 CONTINUE
              C   LOOP OVER TIME PERIODS INVOLVED WITH THIS REQUEST
 0017               DO 500 ITIM=1,JPERS
 0018               JT=JTIM+ITIM-1
              C   FOR EACH TIME PERIOD LOOP OVER ALL JOBS SCHEDULED IN THAT PERIOD
 0019               DO 400 L=1,20
 0020               JBID=JB4TM(JT,L)
 0021               IF (JBID.EQ.0) GO TO 400
              C   FOR EACH JOB ID LOOP OVER ALL PIECES OF EQUIP ASSIGNED TO THAT JOB
 0022               DO 300 M=1,39,2
 0023               IDEQ=IEQ4JB(JBID,M)
 0024               IF (IDEQ.EQ.0) GO TO 300
              C   DECREMENT AVAILABILITY LIST
 0025               JEQAVA(IDEQ,ITIM)=JEQAVA(IDEQ,ITIM)-IEQ4JB(JBID,M+1)
 0026               IF (JEQAVA(IDEQ,ITIM).LT.0) GO TO 600
 0027           300 CONTINUE
 0028               DO 350 MM=1,45
 0029               IDSP=ISP4JB(JBID,MM)
 0030               IF(IDSP.EQ.0) GO TO 350
              C   DECREMENT SPECIFIC EQUIP AVAILABLE LIST
              C   JSPAVA=1 MEANS AVAILABLE
 0031               JSPAVA(IDSP,ITIM)=0
 0032           350 CONTINUE
 0033           400 CONTINUE
 0034           500 CONTINUE
 0035               RETURN
 0036           600 WRITE (6,607) IDEQ,JT
 0037           607 FORMAT(' SUBROUTINE EQAVAL FINDS NEGATIVE AVAILABILITY FOR
                   1EQUIPMENT TYPE'
                   1,I5,' IN TIME PERIOD',I5,'EXECUTION TERMINATING')
 0038               STOP
 0039               END
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           C
           C    SUBROUTINE INSERT(JOB,JTIM,JPERS,JEQAVA,JEQREQ,JOK,JSPAVA)
           C    TRIES TO INSERT JOB INTO THE SCHEDULE STARTING AT TIME JTIM
           C    AND GOING ON FOR JPERS TIME PERIODS. IF JEQAVA AND JSPAVA INDICATE ENOUGH
           C    EQUIPMENT, THEN JOB IS SCHEDULED OTHERWISE ROUTINE RETURNS WITHOUT
           C    AFFECTING THE SCHEDULE
           C    JOK=0 IF FAILED     JOK=1 IF SCHEDULED
           C
           C    NOTE JTIM CORRESPONDS TO FIRST COLUMN OF JEQAVA
           C    JPERS.LE.4 OR ROUTINE SETS IT TO 4
           C
0001              SUBROUTINE INSERT (JOB,JTIM,JPERS,JEQAVA,JEQREQ,JOK,JSPAVA)
0002              DIMENSION IEQ4JB(200,40),ITM4JB(200,2),JB4TM(42,20),NEQUIP(60)
0003              DIMENSION IEQ4CG(60,40),ISP4JB(200,49)
0004              DIMENSION JEQAVA(60,4),JEQREQ(40),JSPAVA(60,4)
0005              COMMON IEQ4JB,ITM4JB,JB4TM,NEQUIP, IEQ4CG
0006              COMMON NTYPE,NSF,ISP4JB
0007              IF (JPERS.GT.4)JPERS=4
0008              JOK=1
           C    CHECK CAN THIS JOB FIT IN THE SCHEDULE
           C    LOOP ON EQUIPMENT REQUESTED FOR THIS JOB
0009              DO 200 M=1,39,2
0010              IDEQ=JEQREQ(M)
0011              IF (IDEQ.EQ.0) GO TO 200
           C    LOOP ON TIME PERIODS FOR THIS REQUEST
0012              DO 100 ITIM=1,JPERS
0013          100 IF (JEQREQ(M+1).GT.JEQAVA(IDEQ,ITIM)) JOK=0
0014          200 CONTINUE
           C    IF JOK STILL 1 THEN JOB CAN BE SCHEDULED ELSE QUIT
0015              IF (JOK.EQ.0) GO TO 601
0016              CALL SPECIF(JOB,JPERS,JEQAVA,JEQREQ,JOK,JSPAVA)
0017              IF (JOK.EQ.0) GO TO 601
           C    FIRST SCHEDULE TIMES
0018              ITM4JB (JOB,1)=JTIM
0019              ITM4JB (JOB,2)=JPERS
0020              DO 400 ITIM=1,JPERS
0021              JT=JTIM+ITIM-1
0022              DO 300 L=1,20
0023              IF (JB4TM(JT,L).NE.0) GO TO 300
0024              JB4TM(JT,L)=JOB
0025              GO TO 400
0026          300 CONTINUE
0027              WRITE (6,307) JT,JOB
0028          307 FORMAT (' MORE THAN 20 JOBS IN JB4TM ARRAY AT TIME',I5,' UNABLE
                 1INSERT',I5)
0029              STOP
0030          400 CONTINUE
           C    NEXT SCHEDULE EQUIP
0031              DO 600 M=1,39,2
           C    FILL IEQ4JB ARRAY
0032              IEQ4JB(JOB,M)=JEQREQ(M)
0033              IEQ4JB(JOB,M+1)=JEQREQ(M+1)
           C    DECREMENT EQUIP AVAILABLE LIST
0034              IDEQ=JEQREQ(M)
0035              IF (IDEQ.EQ.0) GO TO 600
0036              DO 500 ITIM=1,JPERS
0037              JEQAVA (IDEQ,ITIM)=JEQAVA(IDEQ,ITIM)-JEQREQ(M+1)
0038          500 CONTINUE
0039          600 CONTINUE
0040          601 CONTINUE
0041              RETURN
0042              END
```

```
C
C     SUBROUTINE SPECIF CHECKS AVAILABILITY OF THE REQUIRED SPECIFIC EQUIPMENT
C     AND ASSIGNS THEM IF AVAILABLE.  IF NOT, JOK=0
         SUBROUTINE SPECIF(JOB,JPERS,JEQAVA,JEQREQ,JOK,JSPAVA)
         DIMENSION IEQ4JB(200,40),ITM4JB(200,2),JB4TM(42,20),NEQUIP(60)
         DIMENSION IEQ4CG(60,40),ISP4JB(200,45)
         DIMENSION JEQAVA(60,4),JEQREQ(40),JSPAVA(60,4)
         DIMENSION LOOK(17),ISPEC(775)
         DIMENSION ISPTTY(24,8),ISPMTU(24,6)
         DIMENSION NCPU(2)
         COMMON IEQ4JB,ITM4JB,JB4TM,NEQUIP, IEQ4CG
         COMMON NTYPE,NSP,ISP4JB
         COMMON/HELLO/LOOK,ISPEC
         COMMON/HOWDY/ISPTTY,ISPMTU
         NCOMPS=0
         NTTY=0
         NMTU=0
         NTTYAV=0
         NMTUAV=0
         NCPU(1)=0
         NCPU(2)=0
         DO 700 N=1,4
         DO 50 M=1,39,2
         IF(JEQREQ(M).EQ.N) GO TO 51
      50 CONTINUE
         GO TO 700
      51 CONTINUE
C     WE NEED JEQREQ(M+1) COMPUTERS OF TYPE N
         NCOMPS=NCOMPS+1
         NCPUS=JEQREQ(M+1)
         IF (NCPUS.LE.4) GO TO 52
         LAD=(N-1)*4+1
         NADGO=LOOK(LAD)
         NGROUP=1
         GO TO 50
      52 CONTINUE
C     LOOK UP THE ADDRESS OF SINGLES, PAIRS ETC FOR THIS REQUEST
         LAD=(N-1)*4+NCPUS
         NADGO=LOOK(LAD)
         NADEND=LOOK(LAD+1)
         NGROUP=(NADEND-NADGO)/NCPUS
      50 CONTINUE
         DO 60 I=1,NGROUP
         IIAD=NADGO+(I-1)*NCPUS
         DO 61 J=1,NCPUS
         IAD=IIAD+J
         IWANT=ISPEC(IAD)
C     IWANT IS THE ID FOR A CPU IN THE GROUP CURRENTLY BEING EXAMINED
C     IS IWANT AVAILABLE FOR THE PERIODS NEEDED?
C
         DO 62 K=1,JPERS
         IF(JSPAVA(IWANT,K).EQ.0) GO TO 60
C     IWANT IS AVAILABLE
      62 CONTINUE
      61 CONTINUE
C     ALL THE CPUS IN THE GROUP BEING CONSIDERED ARE AVAILABLE FOR JPERS PERIODS
C     ASSIGN THEM
C
         DO 71 J=1,NCPUS
         IAD=IIAD+J
         IWANT=ISPEC(IAD)
         NCPU((N+1)/2)=IWANT
         DO 81 L=1,49
         IF (ISP4JB(JOB,L).NE.0) GO TO 81
         ISP4JB(JOB,L)=IWANT
         DO 72 ITIM=1,JPERS
      72 JSPAVA(IWANT,ITIM)=0
         GO TO 71
      81 CONTINUE
      71 CONTINUE
         GO TO 700
      60 CONTINUE
C     SPECIFIC EQUIPMENT NOT AVAILABLE
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```
0061          JCK=0
0062          GC TO 179C
0063      700 CCNTINUE
      C   WORK CN TTY
0064          DO 15C M=1,39,2
0065          IF (JECREQ(M).EC.55) GC TO 151
0066      150 CCNTINUE
      C   NO TTY REQUIRED
0067          GC TC 889
0068      151 NTTY =JEQREQ(M+1)
0069          IF (NCOMPS.NE.0) GO TO 798
0070          NCPU(1)=1
0071          NCPU(2)=15
0072      798 DC 80C I=1,2
0073          IDCPU=NCPU(I)
0074          IF (IDCPU.EC.0) GO TO 800
0075      799 DC 8C1 J=1,6
0076          ICTTY=ISPTTY(IDCPU,J)
0077          DO 8C2 ITIM=1,JPERS
0078          IF(JSPAVA(ICTTY,ITIM).EQ.0) GO TO 801
0079      802 CCNTINUE
0080          NTTYAV=NTTYAV+1
0081          DC 881 L=1,49
0082          IF (ISP4JB(JCB,L).NE.C) GC TO 881
0083          ISP4JE(JCB,L)=ICTTY
0084          DC 888 ITIM =1,JPERS
0085      888 JSPAVA(IDTTY,ITIM)=0
0086          GC TC 882
0087      881 CCNTINUE
0088      882 IF(NTTYAV.EQ.NTTY) GO TO 889
0089      801 CCNTINUE
0090      800 CCNTINUE
0091          JOK=0
0092          GC TC 1790
0093      889 CCNTINUE
      C   WORK CN MTU
0094          DC 115C M=1,39,2
0095          IF(JEQREQ(M).EQ.5)  GC TO 1151
0096     1150 CCNTINUE
      C   NO MTU REQUIREC
0097          GO TO 7C1
0098     1151 NMTU=JECREQ(M+1)
0099          IF (NCCMPS.NE.0) GO TC 1798
0100          NCPU(1)=1
0101          NCPU(2)=15
0102     1798 DC 18CC I=1,2
0103          IDCPU=NCPU(I)
0104          IF (IDCPU.EC.0) GO TC 1800
0105     1799 DO 18C1 J=1,6
0106          IDMTU=ISPMTU(IDCPU,J)
0107          DC 18C2 ITIM=1,JPERS
0108          IF (JSPAVA(IDMTU,ITIM).EQ.0) GO TO 18C1
0109     1802 CCNTINUE
0110          NMTUAV=NMTUAV+1
0111          DO 1881 L=1,49
0112          IF(ISP4JB(JCB,L).NE.0) GC TO 1881
0113          ISP4JE(JCB,L)=ICMTU
0114          DC 1888 ITIM=1,JPERS
0115     1888 JSPAVA(IDMTU,ITIM)=0
0116          GC TO 1882
0117     1881 CCNTINUE
0118     1882 IF(NMTUAV.EC.NMTU) GO TO 701
0119     18C1 CCNTINUE
0120     1800 CCNTINUE
0121          JCK=0
      C
      C
      C   JOK=C
      C   FIX JSPAVA, ZERO ARRAY ISP4JB
0122     1790 IF(NCCMPS.EC.0) GO TO 890
0123          DC 791 I=1,NCOMPS
0124          DO 792 ITIM=1,JPERS
0125      792 JSPAVA(ISP4JB(JCE,I),ITIM)=1
```

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  791 CCNTINUE
  890 IF(NTTYAV.EQ.0) GO TC 1890
      N1=NCCMPS+1
      N2=NCCMPS+NTTYAV
      DO 891 I=N1,N2
      DC 892 ITIM=1,JPERS
  892 JSPAVA(ISP4JB(JCB,I),ITIM)=1
  891 CONTINUE
 1890 IF(NMTUAV.EQ.0) GO TC 2890
      N3=NCCMPS+NTTYAV+1
      N4=NCCMPS+NTTYAV+NMTUAV
      DC 1891 I=N3,N4
      DC 1892 ITIM=1,JPERS
 1892 JSPAVA(ISP4JB(JCB,I),ITIM)=1
 1891 CCNTINUE
 2890 DC 2891 L=1,49
 2891 ISP4JB(JCB,L)=0
  701 RETURN
      END
```

```
C
C   SUBROUTINE REMOVE REMOVES A JOB FROM THE SCHEDULE
C   A)  IF JOB IS NOT ON THE SCHEDULE, REMOVE RETURNS WITH NO ACTION
C   B)  IF JOB IS ON THE SCHEDULE, THEN
C          1) REMOVE IT FROM THE SCHEDULE
C          2) INCREMENT AVAILABLE EQUIPMENT ARRAY JEQAVA AT TIME JTIM
C           FOR JPERS PERIODS IF JOB OVERLAPS THESE TIMES
C          3) SAVE TIME AND EQUIP ASSIGNMENTS IN JSAVE FOR POSSIBLE REPLACEMENT
C   NOTE  TIME JTIM IS ASSUMED TO CORRESPOND TO THE FIRST COL OF JEQAVA
C
C   NOTE JPERS MUST BE .LE.4 OR ROUTINE WILL SET IT TO 4
      SUBROUTINE REMOVE (JOB,JSAVE,JEQAVA,JTIM,JPERS,JSPAVA)
      DIMENSION IEQ4JB(200,40),ITM4JB(200,2),JB4TM(42,20),NEQUIP(60)
      DIMENSION IEQ4CG(60,40),ISP4JB(200,49)
      DIMENSION JSAVE(91),JEQAVA(60,4),JSPAVA(60,4)
      COMMON IEQ4JB,ITM4JB,JB4TM,NEQUIP, IEQ4CG
      COMMON NTYPE,NSP,ISP4JB
C   FIND JOB ON CURRENT SCHEDULE STARTING AT JOBTM AND RUNNING FOR JOBPER PERIODS
      JOBTIM=ITM4JB (JOB,1)
      IF (JOBTIM.EQ.0) RETURN
      JOBPER=ITM4JB(JOB,2)
C   SAVE TIME ASSIGNMENTS
      JSAVE(1)=JOBTIM
      JSAVE(2)=JOBPER
C   COMPUTE OVERLAP TIME BETWEEN THIS JOB AND EQAVA LIST AS THE TIME INTERVAL
C   J1 TO J2
      ISWTCH=0
      J1=MAX0 (JTIM,JOBTIM)
      K1=JOBTIM+JOBPER-1
      K2=JTIM+JPERS-1
      J2=MIN0 (K1,K2)
C   IF J1.GT.J2, THEN NO OVERLAP. SET SWTCH TO 1
      IF (J1.LE.J2) GO TO 110
      ISWTCH=1
      GO TO 120
C   COMPUTE COLUMN INDICES I1 TO I2 IN JEQAVA ARRAY
  110 I1=J1-JTIM+1
      I2=J2-JTIM+1
C   LOOP OVER EQUIPMENT ID'S IN ASSIGNED EQUIP LIST FOR JOB (MAX OF 20 TYPES)
  120 DO 150 M=1,39,2
C   SAVE EQUIP ASSIGNMENT
      JSAVE(M+2)=IEQ4JB(JOB,M)
      JSAVE(M+3)=IEQ4JB(JOB,M+1)
C   INCREMENT EQUIPMENT AVAILABILITY IF THIS JOB OVERLAPS JEQAVA ARRAY
      IF (ISWTCH.EQ.1) GO TO 145
      ICEQ=IEQ4JB(JOB,M)
      IF (ICEQ.EQ.0) GO TO 145
      DO 140 I=I1,I2
  140 JEQAVA (ICEQ,I)=JEQAVA (ICEQ,I)+IEQ4JB(JOB,M+1)
C   REMOVE EQUIPMENT FROM SCHEDULE
  145 IEQ4JB(JOB,M)=0
      IEQ4JB(JOB,M+1)=0
  150 CONTINUE
      DO 250 M=1,49
      JSAVE(42+M)=ISP4JB(JOB,M)
C   INCREMENT AVAILABILITY IF JOB OVERLAPS JSPAVA
      IF(ISWTCH.EQ.1) GO TO 245
      IDSP=ISP4JB(JOB,M)
      IF(IDSP.EQ.0) GO TO 245
      DO 240 I=I1,I2
  240 JSPAVA(IDSP,I)=1
C   REMOVE SPEC EQUIP FROM SCHED
  245 ISP4JB(JOB,M)=0
  250 CONTINUE
C   REMOVE TIME ASSIGNMENTS FROM THE SCHEDULE
      ITM4JB(JOB,1)=0
      ITM4JB(JOB,2)=0
      DO 200 ITIM=1,JOBPER
      JT=JOBTIM+ITIM-1
      DO 200 L=1,20
  200 IF (JB4TM(JT,L).EQ.JOB) JB4TM(JT,L)=0
      RETURN
      END
```

```
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      C
      C  SUBROUTINE REPLAC                                 REPLACES JOB INTO THE
      C  SCHEDULE AS SPECIFIED IN JSAVE AND UPDATES JEQAVA.  THE ROUTINE ASSUMES
      C  THAT NOTHING HAS CHANGED SINCE A PREVIOUS REMOVE
            SUBROUTINE REPLAC  (JOB,JSAVE,JEQAVA,JTIM,JPERS,JSPAVA)
            DIMENSION IEQ4JB(200,40),ITM4JB(200,2),JB4TM(42,20),NEQUIP(60)
            DIMENSION IEQ4CG(60,40),ISP4JB(200,49)
            DIMENSION JSAVE(91),JEQAVA(60,4),JSPAVA(60,4)
            COMMON IEQ4JB,ITM4JB,JB4TM,NEQUIP, IEQ4CG
            COMMON NTYPE,NSP,ISP4JB
      C  GET START TIME AND NUMBER OF PERIODS
            JOBTIM=JSAVE(1)
            JOBPER=JSAVE(2)
      C  SCHEDULE JOB INTO TIME ARRAYS
            ITM4JB(JOB,1)=JOBTIM
            ITM4JB(JOB,2)=JOBPER
            DO 120 ITIM=1,JOBPER
            JT=JOBTIM+ITIM-1
            DO 100 L=1,20
            IF (JB4TM(JT,L).NE.0) GO TO 100
            JB4TM(JT,L)=JOB
            GO TO 120
        100 CONTINUE
            WRITE (6,107) JT,JOB
        107 FORMAT (' MORE THAN 20 JOBS IN JB4TM ARRAY AT TIME',I5,' UNABLE
           1TO REPLACE JOB',I5)
            STOP
        120 CONTINUE
      C  NEXT SCHEDULE EQUIP
      C  FIRST COMPUTE OVERLAP BETWEEN JOB AND JEQAVA ARRAY
            ISWTCH=0
            J1=MAX0(JTIM,JOBTIM)
            K1=JOBTIM+JOBPER-1
            K2=JTIM+JPERS-1
            J2=MIN0(K1,K2)
      C  IF J1.GT.J2 THEN NO OVERLAP SO SET SWTCH=1
            IF (J1.LE.J2) GO TO 210
            ISWTCH=1
            GO TO 220
      C  COMPUTE COLUMN INDICES I1 AND I2 IN JEQAVA ARRAY
        210 I1=J1-JTIM+1
            I2=J2-JTIM+1
      C  LOOP OVER EQUIPMENT ID'S IN SAVED LIST
        220 DO 250 M=1,39,2
      C  FILL IEQ4JB ARRAY
            IEQ4JB(JOB,M)=JSAVE(M+2)
            IEQ4JB(JOB,M+1)=JSAVE(M+3)
      C
      C  DECREMENT EQUIP AVAILABILITY IF THIS JOB OVERLAPS JEQAVA ARRAY
            IF (ISWTCH.EQ.1) GO TO 245
            ICEQ=JSAVE(M+2)
            IF (ICEQ.EQ.0) GO TO 245
            DO 240 I =I1,I2
            JEQAVA(ICEQ,I)=JEQAVA(ICEQ,I)-JSAVE(M+3)
            IF (JEQAVA(ICEQ,I).LT.0) GO TO 300
        240 CONTINUE
        245 CONTINUE
        250 CONTINUE
      C
            DO 350 M=1,49
            ISP4JB(JOB,M)=JSAVE(42+M)
      C  DECREMENT AVAILABILITY IF JOB OVERLAPS JSPAVA
            IF (ISWTCH.EQ.1) GO TO 345
            ICSP=JSAVE(42+M)
            IF (ICSP.EQ.0) GO TO 345
            DO 340 I=I1,I2
            JSPAVA(ICSP,I)=0
        340 CONTINUE
        345 CONTINUE
        350 CONTINUE
            RETURN
        300 WRITE (6,307) ICEQ,JOB
        307 FORMAT (' EQUIPMENT TYPE',I5,'NOT ADEQUATE TO MEET REQUIREMENT
           1FOR JOB',I5
           1,' UNABLE TO COMPLETE SUBROUTINE REPLAC ')
            STOP
            END
```

```
              C
0001             BLOCK DATA
0002             DIMENSION LOOK(17),ISPEC1(448),ISPEC2(328)
0003             DIMENSION ISPTTY(24,8),ISPMTU(24,6)
0004             COMMON/HELLO/LOOK,ISPEC1,ISPEC2
0005             COMMON/HOWDY/ISPTTY,ISPMTU
0006             DATA LOOK /0,7,49,154,294,301,343,448,588,592,604,616,
                -  622,626,656,716,776 /
0007             DATA ISPEC1/1,2,3,7,6,5,4, 6,7, 5,6, 4,5, 2,3, 3,4, 2,4, 1,2, 5,7,
                A 4,6, 3,5, 4,7, 1,3, 3,6, 2,5, 1,4, 3,7, 2,6, 1,5, 2,7, 1,6, 1,7,
                B 5,6,7, 4,5,6, 3,4,5, 2,3,4, 4,6,7, 4,5,7, 1,2,3, 2,4,5, 3,4,6,
                C3,4,7, 3,5,6, 3,6,7, 3,5,7, 2,3,5, 2,3,6, 2,4,6, 2,5,6, 2,3,7,
                D 2,4,7, 2,5,7, 2,6,7, 1,2,4, 1,3,4, 1,2,5, 1,4,5, 1,3,5, 1,2,6,
                E 1,5,6, 1,3,6, 1,4,6, 1,2,7, 1,6,7, 1,3,7, 1,5,7, 1,4,7,
                F 4,5,6,7, 3,4,5,6, 2,3,4,5, 2,4,5,6, 1,2,3,4, 3,5,6,7, 2,5,6,7,
                G 3,4,6,7, 2,4,6,7, 3,4,5,7, 2,4,5,7, 2,3,4,6, 2,3,5,6, 2,3,4,7,
                H 2,3,6,7, 2,3,5,7, 1,2,3,5, 1,3,4,5, 1,2,4,5, 1,2,3,6, 1,4,5,6,
                I 1,2,5,6, 1,2,4,6, 1,3,5,6, 1,3,4,6, 1,2,3,7, 1,5,6,7, 1,2,6,7,
                J 1,2,5,7, 1,3,6,7, 1,2,4,7, 1,4,6,7, 1,3,4,7, 1,4,5,7, 1,3,5,7,
                K 14,13,12,11,10,9,8,  8,9, 9,10, 10,11, 11,12, 12,13, 13,14,
                L 8,10, 9,11, 10,12, 11,13, 12,14, 8,11, 9,12, 10,13, 11,14,
                M 8,12, 9,13, 10,14, 8,13, 9,14, 8,14,  8,9,10, 12,13,14, 11,12,13,
                N 10,11,12, 9,10,11, 11,13,14, 11,12,14, 9,11,12, 8,9,11,
                O 8,11,12, 9,10,12, 8,9,12, 8,10,11, 8,10,12, 10,12,13, 9,12,13,
                P 8,12,13, 10,11,13, 9,11,13, 8,11,13, 10,13,14, 9,13,14, 8,13,14,
                Q 10,12,14, 9,12,14, 8,12,14, 10,11,14, 9,11,14, 8,11,14, 9,10,13,
                R 9,10,14, 8,9,13, 8,9,14, 8,10,13, 8,10,14 /
0008             DATA ISPEC2/11,12,13,14, 10,11,12,13, 8,9,10,11, 9,10,11,12,
                1 10,12,13,14, 10,11,12,14, 10,11,13,14, 8,9,10,12, 8,10,11,12,
                2 8,9,11,12, 9,11,12,13, 9,10,11,13, 9,10,12,13, 9,10,11,14,
                3 9,12,13,14, 9,10,13,14, 9,10,12,14, 9,11,13,14, 9,11,12,14,
                4 8,9,10,13,8,11,12,13, 8,9,12,13, 8,9,11,13, 8,10,12,13,
                5 8,10,11,13, 8,9,10,14, 8,12,13,14, 8,9,13,14, 8,9,12,14,
                6 8,9,11,14, 8,11,13,14, 8,10,13,14, 8,10,11,14, 8,10,12,14,
                7 8,11,12,14,  15,18,16,17,  16,17, 16,18, 17,18, 15,16, 15,17,
                8 15,18, 16,17,18, 15,16,17, 15,16,18, 15,17,18,   15,16,17,18,
                9 24,22,23,21,20,19,  19,20, 22,24, 22,23, 23,24, 20,21, 19,21,
                1 21,23, 21,22, 21,24, 20,23, 19,23, 20,22, 19,22, 20,24, 19,24,
                2 22,23,24, 19,20,21, 21,22,23, 20,21,23, 19,20,23, 21,23,24,
                3 21,22,24, 19,21,23, 20,21,22, 19,21,22, 19,20,22, 20,22,23,
                4 20,21,24, 19,21,24, 19,20,24, 20,22,24, 20,23,24, 19,22,23,
                5 19,22,24, 19,23,24,   21,22,23,24, 19,20,21,23, 19,20,21,22,
                6  19,20,21,24,  20,22,23,24,
                -              19,22,23,24, 20,21,22,23, 19,21,22,23, 19,20,22,23,
                7 20,21,22,24, 19,21,22,24, 19,20,22,24, 20,21,23,24, 19,21,23,24,
                8 19,20,23,24 /
0009             DATA ISPTTY /
                135,36,36,37,38,38,38,38,38,39,39,39,40,40,41,48,48,47,42,43,44,46,
                +46,46,
                236,37,37,36,37,37,37,37,39,40,40,40,39,39,42,47,47,48,41,44,43,45,
                +45,45,
                337,35,35,38,36,36,36,39,40,38,38,38,38,38,43,41,41,41,43,42,42,44,
                +44,44,
                438,36,38,35,35,39,39,40,37,37,37,37,35,35,44,42,42,42,44,41,41,43,
                +43,43,
                539,39,39,39,39,40,40,36,36,36,36,36,37,37,47,43,43,43,47,47,46,42,
                +42,42,
                640,40,40,40,40,35,35,35,35,35,35,35,36,36,48,44,44,44,48,48,45,41,
                +41,41,
                740,40,40,40,40,35,35,35,35,35,35,35,36,36,46,45,45,45,46,46,47,47,
                +47,47,
                840,40,40,40,40,35,35,35,35,35,35,35,36,36,45,46,46,46,45,45,48,48,
                +48,48/
0010             DATA ISPMTU/
                125,25,26,27,27,27,27,28,28,28,28,28,28,28,31,31,31,31,31,32,32,33,
                +33,33,
                226,26,25,26,26,28,28,29,29,29,29,29,29,29,32,32,32,32,32,31,31,34,
                +34,34,
                327,27,27,25,25,29,29,30,30,30,30,30,30,30,34,34,34,34,34,34,34,32,
                +32,32,
                428,28,28,28,28,30,30,27,27,27,27,27,27,27,33,33,33,33,33,33,33,31,
                +31,31,
                529,29,29,29,29,26,26,26,26,26,26,26,25,25,33,33,33,33,33,33,33,31,
                +31,31,
                630,30,30,30,30,25,25,25,25,25,25,25,26,26,33,33,33,33,33,33,33,31,
                +31,31/
0011             END
```


/.

NBRCFG= 38

CNFG= 1																				
EQ TYPE	1	2	4	5	11	12	14	33	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	3	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 2																				
EQ TYPE	1	4	5	11	14	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 3																				
EQ TYPE	1	2	3	4	5	6	7	9	18	0	0	0	0	0	0	0	0	0	0	0
NUMBER	7	7	4	6	10	2	4	1	1	0	0	0	0	0	0	0	0	0	0	0
CNFG= 4																				
EQ TYPE	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 5																				
EQ TYPE	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 6																				
EQ TYPE	1	5	5	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 7																				
EQ TYPE	1	2	3	5	9	11	12	30	31	32	55	0	0	0	0	0	0	0	0	0
NUMBER	3	3	3	3	1	1	1	1	1	1	3	0	0	0	0	0	0	0	0	0
CNFG= 8																				
EQ TYPE	4	5	26	27	28	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	1	3	5	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 9																				
EQ TYPE	3	5	19	29	37	43	44	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 10																				
EQ TYPE	4	51	5	10	16	29	37	39	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 11																				
EQ TYPE	2	5	32	33	44	51	23	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	4	2	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 12																				
EQ TYPE	2	5	14	27	44	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 13																				
EQ TYPE	3	5	13	20	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 14																				
EQ TYPE	3	5	10	51	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 15																				
EQ TYPE	4	5	7	18	19	24	26	29	51	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0

CNFG= 16																				
EQ TYPE	4	5	7	18	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 17																				
EQ TYPE	4	5	11	12	44	46	51	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 18																				
EQ TYPE	3	5	13	27	46	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 19																				
EQ TYPE	3	4	5	13	34	35	44	51	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	2	2	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 20																				
EQ TYPE	4	5	13	37	51	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 21																				
EQ TYPE	4	5	6	7	21	48	50	54	56	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
CNFG= 22																				
EQ TYPE	4	5	6	7	9	21	51	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 23																				
EQ TYPE	4	5	19	51	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	2	2	1	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 24																				
EQ TYPE	4	5	13	51	46	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 25																				
EQ TYPE	4	5	7	13	51	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 26																				
EQ TYPE	4	5	10	44	46	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	3	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 27																				
EQ TYPE	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 28																				
EQ TYPE	2	5	6	14	51	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 29																				
EQ TYPE	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 30																				
EQ TYPE	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CNFG= 31																				
EQ TYPE	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NUMBER	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
CNFG= 32
  EQ TYPE    2   5  14  32  33  37  44  51  45   0   0   0   0   0   0   0   0   0   0   0
  NUMBER     4   1   1   1   1   1   1   2   3   0   0   0   0   0   0   0   0   0   0   0
CNFG= 33
  EQ TYPE    1   2   5  14  23  32  33  44  51  45   0   0   0   0   0   0   0   0   0   0
  NUMBER     3   4   2   1   1   1   1   1   2   3   0   0   0   0   0   0   0   0   0   0
CNFG= 34
  EQ TYPE    2   5  14  23  27  32  44  51  45   0   0   0   0   0   0   0   0   0   0   0
  NUMBER     4   2   1   1   5   1   1   1   3   0   0   0   0   0   0   0   0   0   0   0
CNFG= 35
  EQ TYPE    3   5  15  23  37  51  46   0   0   0   0   0   0   0   0   0   0   0   0   0
  NUMBER     3   1   1   1   1   1   4   0   0   0   0   0   0   0   0   0   0   0   0   0
CNFG= 36
  EQ TYPE    2   3   5  14  27  32  33  44  51  45   0   0   0   0   0   0   0   0   0   0
  NUMBER     4   3   2   1   5   1   1   1   2   3   0   0   0   0   0   0   0   0   0   0
CNFG= 37
  EC TYPE    1   2   3   5   9  13  12  30  31  32  55   0   0   0   0   0   0   0   0   0
  NUMBER     3   3   3   3   1   1   1   1   1   1   3   0   0   0   0   0   0   0   0   0
CNFG= 38
  EQ TYPE    2  51   5  10  16  29  37  39   0   0   0   0   0   0   0   0   0   0   0   0
  NUMBER     2   2   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0

NTYPE=56 ASP=48
NUMBER OF PIECES CF ECUIPMENT AVAILABLE
TYPE    1 2 3 4  5 6 7 8 910111213141516171819202122232425262728293031323334353637383940414243444546474849505152535455 56
NMBR    7 7 4 6 10 2 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 6 1 1 5 5 2 7 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 4 7 9 5 3 1 1 5 1 6 114 1

JMAX= 91
  JSEQ=  1  JNAME=MAIN   JCNFG=  1   JHRS=  7  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  3
TIMES=  1
  JSEQ=  2  JNAME=MAIN   JCNFG=  1   JHRS=  4  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  4
TIMES=  7
  JSEQ=  3  JNAME=MAIN   JCNFG=  1   JHRS=  4  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  5
TIMES= 13
  JSEQ=  4  JNAME=MAIN   JCNFG=  1   JHRS=  4  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  4
TIMES= 19
  JSEQ=  5  JNAME=MAIN   JCNFG=  1   JHRS=  4  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  5
TIMES= 25
  JSEQ=  6  JNAME=NTDS   JCNFG=  1   JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  1
TIMES=  3
  JSEQ=  7  JNAME=NTDS   JCNFG=  1   JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  1
TIMES=  9
```

```
JSEQ=  8  JNAME=NTDS  JCNFG=  1  JHRS=  5  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  1
TIMES= 15
JSEQ=  9  JNAME=NTDS  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  2
TIMES= 16
JSEQ= 10  JNAME=NTDS  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  2
TIMES= 21
JSEQ= 11  JNAME=NTDS  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  2
TIMES= 27
JSEQ= 12  JNAME=TEAM  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  6
TIMES=  3
JSEQ= 13  JNAME=TEAM  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  6
TIMES=  9
JSEQ= 14  JNAME=TEAM  JCNFG=  1  JHRS=  5  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  6
TIMES= 15
JSEQ= 15  JNAME=TEAM  JCNFG=  2  JHRS=  4  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  7 37
TIMES= 16
JSEQ= 16  JNAME=TEAM  JCNFG=  2  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  7 37
TIMES= 21
JSEQ= 17  JNAME=TEAM  JCNFG=  2  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  7 37
TIMES= 27
JSEQ= 18  JNAME=TDEW  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  8
TIMES=  3
JSEQ= 19  JNAME=TDEW  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  8
TIMES=  9
JSEQ= 20  JNAME=TDEW  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  8
TIMES= 15
JSEQ= 21  JNAME=TDEW  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  8
TIMES= 21
JSEQ= 22  JNAME=TCEW  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  8
TIMES= 27
JSEQ= 23  JNAME=CATC  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  9
TIMES=  3
JSEQ= 24  JNAME=CATC  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  9
TIMES=  9
JSEQ= 25  JNAME=CATC  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  9
TIMES= 15
JSEQ= 26  JNAME=CATC  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  9
TIMES= 21
JSEQ= 27  JNAME=CATC  JCNFG=  1  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG=  9
TIMES= 27
JSEQ= 28  JNAME= AIC  JCNFG=  2  JHRS=  9  NBR TIMES ACCEPTABLE= 1  NBR REJECTED= 41 CONFIG= 10 38
TIMES=  3
```

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 JSEQ= 29   JNAME= AIC   JCNFG=  2   JHRS=  9   NBR TIMES ACCEPTABLE= 1   NBR REJECTED= 41  CONFIG= 10 38
TIMES=   9
 JSEQ= 30   JNAME= AIC   JCNFG=  2   JHRS=  9   NBR TIMES ACCEPTABLE= 1   NBR REJECTED= 41  CONFIG= 10 38
TIMES= 15
 JSEQ= 31   JNAME= AIC   JCNFG=  2   JHRS=  9   NBR TIMES ACCEPTABLE= 1   NBR REJECTED= 41  CONFIG= 10 38
TIMES= 21
 JSEQ= 32   JNAME= AIC   JCNFG=  2   JHRS=  9   NBR TIMES ACCEPTABLE= 1   NBR REJECTED= 41  CONFIG= 10 38
TIMES= 27
 JSEQ= 33   JNAME=JITF   JCNFG=  1   JHRS=  7   NBR TIMES ACCEPTABLE= 3   NBR REJECTED= 14  CONFIG= 11
TIMES=   7 13 19
 JSEQ= 34   JNAME=TIMK   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 3   NBR REJECTED= 39  CONFIG= 12
TIMES=   4  5  6
 JSEQ= 35   JNAME=TIMK   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 3   NBR REJECTED= 39  CONFIG= 12
TIMES= 16 17 18
 JSEQ= 36   JNAME=TIMK   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 3   NBR REJECTED= 39  CONFIG= 12
TIMES= 28 29 30
 JSEQ= 37   JNAME=NTST   JCNFG=  1   JHRS=  8   NBR TIMES ACCEPTABLE= 4   NBR REJECTED= 38  CONFIG= 32
TIMES= 11 12 17 18
 JSEQ= 38   JNAME=NTST   JCNFG=  1   JHRS=  7   NBR TIMES ACCEPTABLE= 2   NBR REJECTED= 40  CONFIG= 33
TIMES= 19 20
 JSEQ= 39   JNAME=NTST   JCNFG=  1   JHRS=  8   NBR TIMES ACCEPTABLE= 4   NBR REJECTED= 38  CONFIG= 34
TIMES= 23 24 29 30
 JSEQ= 40   JNAME=NTST   JCNFG=  1   JHRS=  7   NBR TIMES ACCEPTABLE= 1   NBR REJECTED= 41  CONFIG= 35
TIMES= 25
 JSEQ= 41   JNAME=NTST   JCNFG=  1   JHRS=  8   NBR TIMES ACCEPTABLE= 3   NBR REJECTED= 39  CONFIG= 36
TIMES= 33 34 35
 JSEQ= 42   JNAME=NEAL   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 8   NBR REJECTED= 34  CONFIG= 15
TIMES=   3  4  5  6  9 10 11 12
 JSEQ= 43   JNAME=NEAL   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 8   NBR REJECTED= 34  CONFIG= 16
TIMES= 21 22 23 24 27 28 29 30
 JSEQ= 44   JNAME=GHAY   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 8   NBR REJECTED= 34  CONFIG= 17
TIMES=   3  4  5  6  9 10 11 12
 JSEQ= 45   JNAME=GHAY   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 8   NBR REJECTED= 34  CONFIG= 17
TIMES= 21 22 23 24 27 28 29 30
 JSEQ= 46   JNAME=ANST   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 8   NBR REJECTED= 34  CONFIG= 18
TIMES=   3  4  5  6  9 10 11 12
 JSEQ= 47   JNAME=ANST   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 8   NBR REJECTED= 34  CONFIG= 18
TIMES= 21 22 23 24 27 28 29 30
 JSEQ= 48   JNAME=HEPL   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 6   NBR REJECTED= 36  CONFIG= 19
TIMES=   5  6 11 12 17 18
 JSEQ= 49   JNAME=BURR   JCNFG=  1   JHRS=  4   NBR TIMES ACCEPTABLE= 2   NBR REJECTED= 40  CONFIG= 20
TIMES=   5  6
```

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JSEQ= 50  JNAME=BURR  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 4  NBR REJECTED= 38  CONFIG= 20
TIMES= 11 12 17 18
JSEQ= 51  JNAME=BURR  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 4  NBR REJECTED= 38  CONFIG= 20
TIMES= 23 24 25 30
JSEQ= 52  JNAME=ASIS  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=10  NBR REJECTED= 32  CONFIG= 21
TIMES=  3  4  5 10 15 16 21 22 27 28
JSEQ= 53  JNAME=ASIS  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=10  NBR REJECTED= 32  CONFIG= 21
TIMES=  3  4  5 10 15 16 21 22 27 28
JSEQ= 54  JNAME=ASIS  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=10  NBR REJECTED= 32  CONFIG= 21
TIMES=  3  4  5 10 15 16 21 22 27 28
JSEQ= 55  JNAME=ASIS  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=10  NBR REJECTED= 32  CONFIG= 21
TIMES=  3  4  5 10 15 16 21 22 27 28
JSEQ= 56  JNAME=ASIS  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=10  NBR REJECTED= 32  CONFIG= 21
TIMES=  3  4  5 10 15 16 21 22 27 28
JSEQ= 57  JNAME=ASIS  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=10  NBR REJECTED= 32  CONFIG= 21
TIMES=  3  4  5 10 15 16 21 22 27 28
JSEQ= 58  JNAME=ASIS  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=10  NBR REJECTED= 32  CONFIG= 21
TIMES=  3  4  9 10 15 16 21 22 27 28
JSEQ= 59  JNAME=LAMK  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36  CONFIG= 22
TIMES= 10 11 12 16 17 18
JSEQ= 60  JNAME=LAMK  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36  CONFIG= 22
TIMES= 22 23 24 28 29 30
JSEQ= 61  JNAME=STCK  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 9  NBR REJECTED= 33  CONFIG= 23
TIMES= 10 11 12 22 23 24 28 29 30
JSEQ= 62  JNAME=ERSK  JCNFG=  1  JHRS=  3  NBR TIMES ACCEPTABLE=15  NBR REJECTED= 31  CONFIG= 24
TIMES=  4  5  6  8  9 14 15 20 21 26 27  7  1 30 19
JSEQ= 63  JNAME=FALL  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 9  NBR REJECTED= 33  CONFIG= 25
TIMES= 10 11 12 16 17 18 22 23 24
JSEQ= 64  JNAME=MAXW  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=12  NBR REJECTED= 30  CONFIG= 26
TIMES=  4  5  6 10 11 12 22 23 24 28 29 30
JSEQ= 65  JNAME=CD72  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 9  NBR REJECTED= 33  CONFIG= 27
TIMES= 16 17 18 22 23 24 28 29 30
JSEQ= 66  JNAME=SAIL  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36  CONFIG= 28
TIMES= 10 11 12 16 17 18
JSEQ= 67  JNAME=SAIL  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36  CONFIG= 28
TIMES= 22 23 24 28 29 30
JSEQ= 68  JNAME= BPC  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40  CONFIG= 29
TIMES=  5  6
JSEQ= 69  JNAME= BPC  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40  CONFIG= 29
TIMES= 11 12
JSEQ= 70  JNAME= BPC  JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40  CONFIG= 29
TIMES= 17 18
```

```
JSEQ= 71  JNAME= BPC   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 29
TIMES= 23 24
JSEQ= 72  JNAME= BPC   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 29
TIMES= 29 30
JSEQ= 73  JNAME= BPC   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 29
TIMES= 33 34
JSEQ= 74  JNAME= BPC   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 29
TIMES= 35 36
JSEQ= 75  JNAME= BPC   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 29
TIMES= 39 40
JSEQ= 76  JNAME= BPC   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 29
TIMES= 41 42
JSEQ= 77  JNAME=HALL   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36 CONFIG= 30
TIMES=  1  2  3  4  5  6
JSEQ= 78  JNAME=HALL   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36 CONFIG= 30
TIMES=  7  8  9 10 11 12
JSEQ= 79  JNAME=HALL   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36 CONFIG= 30
TIMES= 13 14 15 16 17 18
JSEQ= 80  JNAME=HALL   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36 CONFIG= 30
TIMES= 19 20 21 22 23 24
JSEQ= 81  JNAME=HALL   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 6  NBR REJECTED= 36 CONFIG= 30
TIMES= 25 26 27 28 29 30
JSEQ= 82  JNAME=MPDS   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 31
TIMES=  3  4
JSEQ= 83  JNAME=MPDS   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 31
TIMES=  9 10
JSEQ= 84  JNAME=MPDS   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 31
TIMES= 15 16
JSEQ= 85  JNAME=MPDS   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 31
TIMES= 21 22
JSEQ= 86  JNAME=MPDS   JCNFG=  1  JHRS=  8  NBR TIMES ACCEPTABLE= 2  NBR REJECTED= 40 CONFIG= 31
TIMES= 27 28
JSEQ= 87  JNAME=BURK   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 3  NBR REJECTED= 39 CONFIG= 13
TIMES=  2  3  4
JSEQ= 88  JNAME=BURK   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 3  NBR REJECTED= 39 CONFIG= 13
TIMES=  8  9 10
JSEQ= 89  JNAME=BURK   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 3  NBR REJECTED= 39 CONFIG= 13
TIMES= 14 15 16
JSEQ= 90  JNAME=BURK   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE= 3  NBR REJECTED= 39 CONFIG= 13
TIMES= 20 21 22
JSEQ= 91  JNAME=NAOR   JCNFG=  1  JHRS=  4  NBR TIMES ACCEPTABLE=23  NBR REJECTED= 19 CONFIG= 14
TIMES=  4  5  6 10 11 12 16 17 18 22 23 24 28 29 30 33 34 35 36 39 40 41 42
```

```
SUMMARY OF SCHEDULING PROCESS
    WORKING ON JOB   1
        TRY IT IN     RESULT
            1            1
    WORKING CN JOB   2
        TRY IT IN     RESULT
            7            1
    WORKING CN JOB   3
        TRY IT IN     RESULT
           13            1
    WORKING CN JOB   4
        TRY IT IN     RESULT
           15            1
    WORKING CN JOB   5
        TRY IT IN     RESULT
           25            1
    WORKING CN JOB   6
        TRY IT IN     RESULT
            3            1
    WORKING CN JOB   7
        TRY IT IN     RESULT
            9            1
    WORKING CN JOB   8
        TRY IT IN     RESULT
           15            1
    WORKING CN JOB   9
        TRY IT IN     RESULT
           16            1
    WORKING CN JOB   1C
        TRY IT IN     RESULT
           21            1
    WORKING CN JOB   11
        TRY IT IN     RESULT
           27            1
    WORKING CN JOB   12
        TRY IT IN     RESULT
            3            1
    WORKING CN JOB   13
        TRY IT IN     RESULT
            9            1
    WORKING CN JOB   14
        TRY IT IN     RESULT
           15            1
    WORKING CN JOB   15
        TRY IT IN     RESULT
           16            C
        NCW TRY IN    REMOVE JOB   15FIT?
           16
                 9            1
                                          TRY TO REPLACE   9
                                          IN PERIOD      RESULT
                                              16            0

    WORKING CN JOB   15
        TRY IT IN     RESULT
           16            1
    WORKING CN JOB   16
        TRY IT IN     RESULT
           21            0
        NCW TRY IN    REMOVE JOB   16FIT?
           21
```

```
                    10         1
                                        TRY TO REPLACE 10
                                        IN PERIOD     RESULT
                                            21          0
WORKING CN JOB  16
     TRY IT IN    RESULT
         21         1
WORKING CN JCB  17
     TRY IT IN    RFSULT
         27         0
     NCW TRY IN   REPOVE JOB   17FIT?
         27
                    11         1
                                        TRY TO REPLACE 11
                                        IN PERIOD     RESULT
                                            27          0
WORKING CN JOB  17
     TRY IT IN    RESULT
         27         1
WORKING CN JOB  18
     TRY IT IN    RESULT
         3          1
WORKING CN JOB  19
     TRY IT IN    RESULT
         S          1
WCRKING ON JOB  20
     TRY IT IN    RESULT
         15         1
WORKING ON JOB  21
     TRY IT IN    RESULT
         21         1
WORKING ON JOB  22
     TRY IT IN    RESULT
         27         1
WCRKING GN JOB  23
     TRY IT IN    RESULT
         2          1
WORKING ON JOB  24
     TRY IT IN    RESULT
         S          1
WORKING ON JOB  25
     TRY IT IN    RESULT
         15         0
     NCW TRY IN   REPOVE JOB   25FIT?
         15
                    8          0
                    14         0
                    20         0
WORKING ON JOB  26
     TRY IT IN    RESULT
         21         C
     NCW TRY IN   REMOVE JOB   26FIT?
         21
                    10         0
                    16         1
                                        TRY TO REPLACE 16
                                        IN PERIOD     RESULT
                                            21          0
                                            21          0
                    21         0
WORKING GN JOB  27
     TRY IT IN    RESULT
         27         C
     NCW TRY IN   REPOVE JOB   27FIT?
         27
                    11         0
                    17         1
                                        TRY TO REPLACE 17
                                        IN PERIOD     RESULT
                                            27          0
                                            27          0
```

```
                          22          0
WORKING CN JOB  28
     TRY IT IN    RESULT
        3            C
     NCW TRY IN   REMOVE JOB   28FIT?
           3
                           6          1
                                            TRY TO REPLACE  6
                                            IN PERIOD      RESULT
                                                3              0
                          12          0
                          18          1
                                            TRY TO REPLACE 18
                                            IN PERIOD      RESULT
                                                3              0
                          23          0
WORKING CN JOB  28
     TRY IT IN    RESULT
        3            1
WORKING CN JOB  29
     TRY IT IN    RESULT
        9            C
     NCW TRY IN   REMOVE JOB   29FIT?
           9
                           7          1
                                            TRY TO REPLACE  7
                                            IN PERIOD      RESULT
                                                9              0
                          13          0
                          19          1
                                            TRY TO REPLACE 19
                                            IN PERIOD      RESULT
                                                9              0
                          24          0
WORKING CN JOB  29
     TRY IT IN    RESULT
        9            1
WORKING CN JOB  30
     TRY IT IN    RESULT
       15            C
     NCW TRY IN   REMOVE JOB   30FIT?
          15
                           8          0
                          14          0
                          20          1
                                            TRY TO REPLACE 20
                                            IN PERIOD      RESULT
                                               15              0
WORKING CN JOB  30
     TRY IT IN    RESULT
       15            1
WORKING CN JOB  31
     TRY IT IN    RESULT
       21            C
     NCW TRY IN   REMOVE JOB   31FIT?
```

```
            21
                    10        1
                                   TRY TO REPLACE 10
                                   IN PERIOD     RESULT
                                       21          0
                    16        0
                    21        1
                                   TRY TO REPLACE 21
                                   IN PERIOD     RESULT
                                       21          0
WORKING CN JOB  31
     TRY IT IN   RESULT
         21        1
WORKING CN JOB  32
     TRY IT IN   RESULT
         27        C
     NCW TRY IN  REMOVE JOB   32FIT?
         27
                    11        1
                                   TRY TO REPLACE 11
                                   IN PERIOD     RESULT
                                       27          0
                    17        0
                    22        1
                                   TRY TO REPLACE 22
                                   IN PERIOD     RESULT
                                       27          0
WORKING CN JOB  32
     TRY IT IN   RESULT
         27        1
WORKING ON JOB  33
     TRY IT IN   RESULT
         7         1
WORKING CN JOB  34
     TRY IT IN   RESULT
         4         C
         5         1
WORKING CN JOB  35
     TRY IT IN   RESULT
         16        C
         17        1
WORKING CN JOB  36
     TRY IT IN   RESULT
         28        C
         25        1
WORKING CN JOB  37
     TRY IT IN   RESULT
         11        1
WCRKING CN JOB  38
     TRY IT IN   RESULT
         19        1
WORKING CN JOB  39
     TRY IT IN   RESULT
         23        1
WORKING CN JOB  40
     TRY IT IN   RESULT
         25        1
WORKING ON JOB  41
     TRY IT IN   RESULT
         33        1
WORKING CN JOB  42
     TRY IT IN   RESULT
         3         C
         4         0
         5         1
```

```
WORKING CN JOB   43
     TRY IT IN    RESULT
          21          C
          22          C
          23          1
WORKING CN JOB   44
     TRY IT IN    RESULT
           3          0
           4          0
           5          1
WORKING CN JOB   45
     TRY IT IN    RESULT
          21          C
          22          C
          23          1
WORKING CN JOB   46
     TRY IT IN    RESULT
           3          C
           4          0
           5          1
WORKING CN JOB   47
     TRY IT IN    RESULT
          21          C
          22          0
          23          C
          24          0
          27          C
          28          C
          25          1
WORKING CN JOB   48
     TRY IT IN    RESULT
           5          C
           6          1
WORKING CN JOB   49
     TRY IT IN    RESULT
           5          0
           6          0
     NCW TRY IN   REMOVE JOB    49FIT?
           5
                      34           0
                      42           0
                      44           0
                      46           0
           6
                      48           1
                                         TRY TO REPLACE 48
                                         IN PERIOD      RESULT
                                              5            0
                                              6            0
                                             11            1

WORKING CN JOB   50
     TRY IT IN    RESULT
          11          0
          12          1
WORKING CN JOB   51
     TRY IT IN    RESULT
          23          C
          24          1
WORKING CN JOB   52
     TRY IT IN    RESULT
           3          1
```

```
WORKING CN JOB   53
     TRY IT IN    RESULT
          3          0
          4          1
WORKING ON JOB   54
     TRY IT IN    RESULT
          3          C
          4          0
          5          1
WORKING CN JOB   55
     TRY IT IN    RESULT
          3          0
          4          C
          9          0
         10          1
WORKING CN JOB   56
     TRY IT IN    RESULT
          3          0
          4          C
          9          0
         10          C
         15          1
WORKING CN JOB   57
     TRY IT IN    RESULT
          3          0
          4          C
          9          0
         10          C
         15          C
         16          1
WORKING CN JOB   58
     TRY IT IN    RESULT
          3          C
          4          0
          9          0
         10          C
         15          C
         16          C
         21          1
WORKING CN JOB   59
     TRY IT IN    RESULT
         10          C
         11          1
WORKING CN JOB   60
     TRY IT IN    RESULT
         22          0
         23          1
WORKING CN JOB   61
     TRY IT IN    RESULT
         10          0
         11          C
         12          1
WORKING CN JOB   62
     TRY IT IN    RESULT
          4          0
          5          0
          6          C
          8          1
WORKING CN JOB   63
     TRY IT IN    RESULT
         10          C
         11          C
         12          C
```

```
      16         0
      17         1
WORKING ON JOB   64
     TRY IT IN   RESULT
       4         0
       5         0
       6         1
WORKING ON JOB   65
     TRY IT IN   RESULT
      16         1
WORKING ON JOB   66
     TRY IT IN   RESULT
      10         0
      11         0
      12         0
      16         0
      17         0
      18         1
WORKING ON JOB   67
     TRY IT IN   RESULT
      22         0
      23         0
      24         0
      28         0
      29         0
      30         1
WORKING ON JOB   68
     TRY IT IN   RESULT
       5         1
WORKING ON JOB   69
     TRY IT IN   RESULT
      11         1
WORKING ON JOB   70
     TRY IT IN   RESULT
      17         1
WORKING ON JOB   71
     TRY IT IN   RESULT
      23         1
WORKING ON JOB   72
     TRY IT IN   RESULT
      29         1
WORKING ON JOB   73
     TRY IT IN   RESULT
      33         1
WORKING ON JOB   74
     TRY IT IN   RESULT
      35         1
WORKING ON JOB   75
     TRY IT IN   RESULT
      39         1
WORKING ON JOB   76
     TRY IT IN   RESULT
      41         1
WORKING ON JOB   77
     TRY IT IN   RESULT
       1         0
       2         0
       3         1
WORKING ON JOB   78
     TRY IT IN   RESULT
       7         0
       8         0
       9         1
```

```
WORKING CN JOB  79
     TRY IT IN    RESULT
          13        C
          14        1
WCRKING CN JOB  80
     TRY IT IN    RESULT
          19        C
          2C        C
          21        1
WORKING CN JOB  81
     TRY IT IN    RESULT
          25        C
          26        1
WORKING CN JOB  82
     TRY IT IN    RESULT
           3        C
           4        0
     NCW TRY IN   REPOVE JOB   82FIT?
          3
                    6          1
                                          TRY TO REPLACE  6
                                          IN PERIOD      RESULT
                                                3           0
                   12          0
                   18          0
                   23          0
                   28          1
                                          TRY TO RFPLACE 28
                                          IN PERIOD      RESULT
                                                3           0
                                                3           0
                   52          0
                   77          1
                                          TRY TO REPLACE 77
                                          IN PERIOD      RESULT
                                                1           0
                                                2           0
                                                3           0
                                                4           0
                                                5           1
WORKING CN JOB  83
     TRY IT IN    RESULT
           9        C
          10        C
     NOW TRY IN   REMOVE JOB   83FIT?
          9
                    7          1
                                          TRY TO REPLACE  7
                                          IN PERIOD      RESULT
                                                9           0
                   13          0
                   19          0
                   24          0
                   29          1
                                          TRY TO REPLACE 29
                                          IN PERIOD      RESULT
                                                9           0
                                                9           0
                   54          0
                   78          1
                                          TRY TO REPLACE 78
                                          IN PERIOD      RESULT
                                                7           0
```

```
                                                              8        0
                                                              9        0
                                                             10        0
                                                             11        1
WCRKING ON JOB  84
     TRY IT IN   RESULT
      15          0
      16          C
    NCW TRY IN  REPOVE JOB  84FIT?
      15
                  6          0
                 14          0
                 20          0
                 30          1
                                 TRY TO REPLACE 30
                                 IN PERIOD    RESULT
                                      15        0
                                      15        0
                 56          0
                 79          0
      16
                  9          0
                 15          0
                 20          0
                 30          1
                                 TRY TO REPLACE 30
                                 IN PERIOD    RESULT
                                      15        0
                                      15        0
                 57          0
                 65          1
                                 TRY TO REPLACE 65
                                 IN PERIOD    RESULT
                                      16        0
                                      17        1
WORKING CN JOB  85
     TRY IT IN   RESULT
      21          0
      22          0
    NGW TRY IN  REPOVE JOB  85FIT?
      21
                 10          0
                 16          1
                                 TRY TO REPLACE 16
                                 IN PERIOD    RESULT
                                      21        0
                                      21        0
                 21          0
                 31          1
                                 TRY TO REPLACE 31
                                 IN PERIOD    RESULT
                                      21        0
                                      21        0
                 58          0
                 80          1
                                 TRY TO REPLACE 80
                                 IN PERIOD    RESULT
                                      19        0
                                      20        0
                                      21        0
                                      22        0
                                      23        1
WORKING CN JOB  86
```

```
        TRY IT IN    RESULT
             27          0
             28          1
WORKING CN JOB   87
        TRY IT IN    RESULT
              2          C
              3          1
WORKING CN JOB   88
        TRY IT IN    RESULT
              8          C
              9          1
WORKING CN JOB   89
        TRY IT IN    RESULT
             14          1
WORKING CN JOB   90
        TRY IT IN    RESULT
             20          C
             21          0
             22          C
        NCW TRY IN   REMOVE  JOB    90FIT?
             20
                          38            0
             21
                          10            0
                          16            1
                                              TRY TO REPLACE 16
                                              IN PERIOD      RESULT
                                                  21           0
                                                  21           0
                          21            0
                          31            0
                          58            0
                          85            0
             22
                          10            0
                          16            1
                                              TRY TO REPLACE 16
                                              IN PERIOD      RESULT
                                                  21           0
                                                  21           0
                          21            0
                          31            0
                          85            0
WORKING CN JOB   91
        TRY IT IN    RESULT
              4          0
              5          0
              6          0
             10          C
             11          C
             12          C
             16          C
             17          1
```

JOBS SCHEDULED IN EACH PERIOD

TIME	JOBS																			
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	6	12	18	23	28	52	82	87	0	0	0	0	0	0	0	0	0	0	0	0
4	6	12	18	23	28	53	82	0	0	0	0	0	0	0	0	0	0	0	0	0
5	34	42	44	46	68	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	49	64	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	2	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	32	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	7	13	19	24	29	54	83	88	0	0	0	0	0	0	0	0	0	0	0	0
10	7	13	19	24	29	55	83	0	0	0	0	0	0	0	0	0	0	0	0	0
11	37	48	59	69	78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	37	50	61	78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	79	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	8	14	20	30	56	79	89	0	0	0	0	0	0	0	0	0	0	0	0	0
16	9	15	20	30	57	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	35	63	70	84	65	91	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	4	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	10	16	21	31	58	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	10	16	21	31	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	39	43	45	60	71	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	39	51	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	5	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	40	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	11	17	22	32	81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	11	17	22	32	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	36	47	72	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	41	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
                    SCHEDULE SUMMARY BY JOB

JOB NUMBER    1
          JOB NAME=  MAIN
          START TIME=   1
          NBR OF PERS=  2
          CONFIG NBR=  3
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A    C&S2 TYPE B    C&S1 A   C&S1 B        C&S2 MTU     C&S1 MTU C&S2 TTY    C&S1 TTY
 A B C D E S N  M L K H P Q R  1 7 8 9  2 3 4 5 6 10  A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 1 1 1 1 1 1 1  1 1 1 1 1 1 1  1 1 1 1  1 1 1 1 1 1   1 1 1 1 1 1  1 1 1 1  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1    2    3    4    5    6    7    9   18    0    0    0    0    0    0    0    0    0    0    0
 NMBR    7    7    4    6   10    2    4    1    1    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER    2
          JOB NAME=  MAIN
          START TIME=   7
          NBR OF PERS=  1
          CONFIG NBR=  4
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A    C&S2 TYPE B    C&S1 A   C&S1 B        C&S2 MTU     C&S1 MTU C&S2 TTY    C&S1 TTY
 A B C D E S N  M L K H P Q R  1 7 8 9  2 3 4 5 6 10  A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0  0 0 0 0 0 0 0  1 1 1 1  1 1 1 1 1 1   0 0 0 0 0 0  0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    3    4    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    4    6    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER    3
          JOB NAME=  MAIN
          START TIME=  13
          NBR OF PERS=  1
          CONFIG NBR=  5
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A    C&S2 TYPE B    C&S1 A   C&S1 B        C&S2 MTU     C&S1 MTU C&S2 TTY    C&S1 TTY
 A B C D E S N  M L K H P Q R  1 7 8 9  2 3 4 5 6 10  A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 1 1 1 1 1 1 1  1 1 1 1 1 1 1  0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0  0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1    2    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    7    7    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
```

```
JCB NUMBER    4
          JOB NAME=  MAIN
          START TIME=  19
          NBR CF PERS=  1
          CCNFIG NBR=  4
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU         C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N    P L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K      1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 C 0 0 0 C 0 C    C 0 0 C 0 0 0    1 1 1 1    1 1 1 1 1 1     0 0 0 0 0 0      0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 C

OTHER EQUIPMENT

 TYPE   3   4   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   4   6   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JCB NUMBER    5
          JCB NAME=  MAIN
          START TIME=  25
          NBR OF PERS=  1
          CCNFIG NBR=  5
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU         C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N    P L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K      1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 1 1 1 1 1 1 1    1 1 1 1 1 1 1    0 0 0 0    0 0 0 0 0 0     0 0 0 0 0 0      0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 C

CTHER EQUIPMENT

 TYPE   1   2   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   7   7   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JCB NUMBER    6
          JCB NAME=  NTDS
          START TIME=  3
          NBR OF PERS=  2
          CCNFIG NBR=  1
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU         C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N    P L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K      1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 1 C 0 C 0 0 0    1 1 1 C 0 0 0    0 0 0 0    1 1 0 0 0 0     0 0 0 1 0 0      0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE   1   2   4   5  11  12  14  33   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   1   3   2   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
```

```
JOB NUMBER    7
          JOB NAME=  NTCS
          START TIME=   9
          NBR OF PERS=  2
          CONFIG NBR=  1
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU  C&S2 TTY      C&S1 TTY
 A B C D E S N    F L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6   A C D E H P   1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0    1 1 1 0 0 0 0    0 0 0 0    1 1 0 0 0 0     0 0 0 1 0 0    0 0 0 0   0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1   2   4   5   11   12   14   33   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   3   2   1   1    1    1    1    0   0   0   0   0   0   0   0   0   0   0   0


JOB NUMBER    8
          JOB NAME=  NTCS
          START TIME=  15
          NBR OF PERS=  1
          CONFIG NBR=  1
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU  C&S2 TTY      C&S1 TTY
 A B C D E S N    F L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6   A C D E H P   1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0    1 1 1 0 0 0 0    0 0 0 0    1 1 0 0 0 0     0 0 0 1 0 0    0 0 0 0   0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1   2   4   5   11   12   14   33   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   3   2   1   1    1    1    1    0   0   0   0   0   0   0   0   0   0   0   0


JOB NUMBER    9
          JOB NAME=  NTCS
          START TIME=  16
          NBR OF PERS=  1
          CONFIG NBR=  2
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU  C&S2 TTY      C&S1 TTY
 A B C D E S N    F L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6   A C D E H P   1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0    0 0 0 0 0 0 0    0 0 0 0    1 1 0 0 0 0     1 0 0 0 0 0    0 0 0 0   0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1   4   5   11   14   33   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   2   1   1    1    1    0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
JCB NUMBER  10
        JCB NAME=  NTCS
        START TIME=  21
        NBR OF PERS=  2
        CCNFIG NBR=  2
SPECIFIC ECUIPMENT ASSIGNEC

  C&S2 TYPE A    C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU     C&S1 MTU C&S2 TTY    C&S1 TTY
  A B C D E S N  F L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
  1 0 C 0 0 0 C  0 0 0 C 0 0 0    0 0 0 0   1 1 0 0 0 0     1 0 0 0 0 0  0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

CTHER EQUIPMENT

  TYPE    1  4  5  11  14  33  0  0  0  0  0  0  0  0  0  0  0  0  0  0
  NMBR    1  2  1   1   1   1  0  0  0  0  0  0  0  0  0  0  0  0  0  0


JCB NUMBER  11
        JCB NAME=  NTDS
        START TIME=  27
        NBR OF PERS=  2
        CCNFIG NBR=  2
SPECIFIC ECUIPMENT ASSIGNEC

  C&S2 TYPE A    C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU     C&S1 MTU C&S2 TTY    C&S1 TTY
  A B C D E S N  F L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
  1 0 C 0 C C C  C 0 0 0 0 0 0    0 0 0 0   1 1 0 0 0 0     1 0 0 0 0 0  0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

  TYPE    1  4  5  11  14  33  0  0  0  0  0  0  0  0  0  0  0  0  0  0
  NMBR    1  2  1   1   1   1  0  0  0  0  0  0  0  0  0  0  0  0  0  0


JCB NUMBER  12
        JCB NAME=  TEAM
        START TIME=  3
        NBR OF PERS=  2
        CCNFIG NBR=  6
SPECIFIC ECUIPMENT ASSIGNEC

  C&S2 TYPE A    C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU     C&S1 MTU C&S2 TTY    C&S1 TTY
  A B C D E S N  F L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
  0 0 0 0 1 1 1  0 0 0 C 0 0 0    0 0 0 0   0 0 0 0 0 0     0 C 1 0 0 0  0 0 0 0  0 0 0 1 0 0  0 0 0 0 C 0 0 0

OTHER EQUIPMENT

  TYPE    1  5  9  55  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
  NMBR    1  1  1   1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0


JCB NUMBER  13
        JCB NAME=  TEAM
        START TIME=  9
        NBR OF PERS=  2
        CCNFIG NBR=  6
SPECIFIC ECUIPMENT ASSIGNEC

  C&S2 TYPE A    C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU     C&S1 MTU C&S2 TTY    C&S1 TTY
  A B C D E S N  F L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
  0 0 0 0 1 1 1  0 0 0 C C 0 0    0 0 0 0   0 0 0 0 0 0     0 0 1 0 0 0  0 0 0 0  0 0 0 1 0 0  0 0 0 0 0 0 0 0
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OTHER EQUIPMENT

 TYPE    1   5   9  55   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    3   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0


JOB NUMBER  14
        JOB NAME=  TEAM
        START TIME=  15
        NBR OF PERS=  1
        CONFIG NBR=  6
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 1 1 1   C 0 0 C 0 0 0   0 0 0 0   0 0 0 0 0 0     0 0 1 0 0 0    0 0 0 0  0 0 0 1 0 0  0 0 0 0 0 0 0 C

OTHER EQUIPMENT

 TYPE    1   5   9  55   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    3   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0


JOB NUMBER  15
        JOB NAME=  TEAM
        START TIME=  16
        NBR OF PERS=  1
        CONFIG NBR= 37
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R   1 7 8 9   2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 1 1 1   1 1 1 0 0 0 0   0 1 1 1   0 0 0 0 0 0     0 0 0 1 1 1    0 0 0 0  0 0 0 1 1 1  0 0 0 0 0 0 0 C

OTHER EQUIPMENT

 TYPE    1   2   3   5   9  13  12  30  31  32  55   0   0   0   0   0   0   0   0   0
 NMBR    3   3   3   3   1   1   1   1   1   1   3   0   0   0   0   0   0   0   0   0


JOB NUMBER  16
        JOB NAME=  TEAM
        START TIME=  21
        NBR OF PERS=  2
        CONFIG NBR= 37
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R   1 7 8 9   2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 C 0 0 0 1 1 1   1 1 1 0 0 0 0   0 1 1 1   0 0 0 0 0 0     0 0 0 1 1 1    0 0 0 0  0 0 0 1 1 1  0 0 0 0 0 0 0 0
```

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OTHER EQUIPMENT

 TYPE    1    2    3    5    9   13   12   30   31   32   55    0    0    0    0    0    0    0    0    0
 NMBR    3    3    3    3    1    1    1    1    1    1    3    0    0    0    0    0    0    0    0    0


JOB NUMBER  17
          JOB NAME=   TEAM
          START TIME=   27
          NBR OF PERS=   2
          CONFIG NBR=  37
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 1 1 1    1 1 1 0 0 0 0    0 1 1 1    0 0 0 0 0 0     0 0 0 1 1 1    0 0 0 0  0 0 0 1 1 1  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1    2    3    5    9   13   12   30   31   32   55    0    0    0    0    0    0    0    0    0
 NMBR    3    3    3    3    1    1    1    1    1    1    3    0    0    0    0    0    0    0    0    0


JOB NUMBER  18
          JOB NAME=   TDEW
          START TIME=    3
          NBR OF PERS=   2
          CONFIG NBR=   6
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0    0 0 0 0 0 0 0    0 0 0 0    0 0 0 1 1 1     0 0 0 0 0 0    0 0 1 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    4    5   26   27   28   47    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    3    1    3    5    2    2    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER  19
          JOB NAME=   TDEW
          START TIME=    9
          NBR OF PERS=   2
          CONFIG NBR=   8
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0    0 0 0 0 0 0 0    0 0 0 0    0 0 0 1 1 1     0 0 0 0 0 0    0 0 1 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    4    5   26   27   28   47    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    3    1    3    5    2    2    0    0    0    0    0    0    0    0    0    0    0    0    0    0
```

```
JOB NUMBER   20
          JOB NAME=   TDEW
          START TIME=   15
          NBR OF PERS=   2
          CONFIG NBR=   6
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A      C&S1 B           C&S2 MTU         C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9     2 3 4 5 6 10     A B C G J K      1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0    0 0 0 0 0 0 0    0 0 0 0     0 0 0 1 1 1      0 0 0 0 0 0      0 0 1 0  0 0 0 0 0 0     0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE     4    5   26   27   28   47    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR     3    1    3    5    2    2    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER   21
          JOB NAME=   TDEW
          START TIME=   21
          NBR OF PERS=   2
          CONFIG NBR=   8
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A      C&S1 B           C&S2 MTU         C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9     2 3 4 5 6 10     A B C G J K      1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0    0 0 0 0 0 0 0    0 0 0 0     0 0 0 1 1 1      0 0 0 0 0 0      0 0 1 0  0 0 0 0 0 0     0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE     4    5   26   27   28   47    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR     3    1    3    5    2    2    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER   22
          JOB NAME=   TDEW
          START TIME=   27
          NBR OF PERS=   2
          CONFIG NBR=   8
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A      C&S1 B           C&S2 MTU         C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9     2 3 4 5 6 10     A B C G J K      1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0    0 0 0 0 0 0 0    0 0 0 0     0 0 0 1 1 1      0 0 0 0 0 0      0 0 1 0  0 0 0 0 0 0     0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE     4    5   26   27   28   47    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR     3    1    3    5    2    2    0    0    0    0    0    0    0    0    0    0    0    0    0    0
```

```
JOB NUMBER  23
            JOB NAME=  CATC
            START TIME=   3
            NBR OF PERS=  2
            CONFIG NBR=  9
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY       C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P    1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0    0 1 1 0    0 0 0 0 0 0     0 0 0 0 0 0     1 0 0 0  0 0 0 0 0 0    0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE     3    5   19   29   37   43   44    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR     2    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0

JOB NUMBER  24
            JOB NAME=  CATC
            START TIME=   9
            NBR OF PERS=  2
            CONFIG NBR=  9
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY       C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P    1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0    0 1 1 0    0 0 0 0 0 0     0 0 0 0 0 0     1 0 0 0  0 0 0 0 0 0    0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE     3    5   19   29   37   43   44    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR     2    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0

JOB NUMBER  25
            NOT SCHEDULED  ********************
            JOB NAME=  CATC
            START TIME=   0
            NBR OF PERS=  0
            CONFIG NBR=  9
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY       C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P    1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0    0 0 0 0    0 0 0 0 0 0     0 0 0 0 0 0     0 0 0 0  0 0 0 0 0 0    0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE     0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR     0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
```

```
JCB NUMBER  26
          NOT SCHEDULED  ********************
          JCB NAME=  CATC
          START TIME=   0
          NBR OF PERS=  0
          CCNFIG NBR=  9
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N    P L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 C 0 0 0 C 0 C    0 0 0 0 0 0 0    0 0 0 0    0 0 0 0 0 0     0 0 0 0 0 0     0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 C

CTHER EQUIPMENT

 TYPE    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER  27
          NOT SCHEDULEC  ********************
          JCB NAME=  CATC
          START TIME=   0
          NBR CF PERS=  0
          CCNFIG NBR=  9
SPECIFIC EQUIPMENT ASSIGNEC

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N    P L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 C 0 C    C 0 0 0 0 0 0    0 0 0 0    0 0 0 0 0 0     0 0 0 0 0 0     0 0 0 0  0 0 0 0 0 0   0 0 0 0 C 0 0 C

CTHER EQUIPMENT

 TYPE    0    C    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER  28
          JCB NAME=   AIC
          START TIME=   3
          NBR OF PERS=  2
          CCNFIG NBR= 38
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N    P L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 C 0 C 0 C 0 C    0 0 0 1 1 0 0    0 0 0 0    0 0 0 0 0 0     0 0 0 0 1 0     0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 C

CTHER EQUIPMENT

 TYPE    2   51    5   10   16   29   37   39    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    2    2    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0
```

```
JOB NUMBER  29
        JOB NAME=   AIC
        START TIME=   9
        NBR OF PERS=  2
        CONFIG NBR= 38
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 1 1 0 0   0 0 0 0   0 0 0 0 0 0    0 0 0 0 1 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE   2   51   5   10   16   29   37   39   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   2    2   1    1    1    1    1    1   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER  30
        JOB NAME=   AIC
        START TIME=  15
        NBR OF PERS=  2
        CONFIG NBR= 38
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 1 1 0 0   0 0 0 0   0 0 0 0 0 0    0 1 0 0 0 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE   2   51   5   10   16   29   37   39   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   2    2   1    1    1    1    1    1   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER  31
        JOB NAME=   AIC
        START TIME=  21
        NBR OF PERS=  2
        CONFIG NBR= 38
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 1 1 0 0   0 0 0 0   0 0 0 0 0 0    0 0 1 0 0 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE   2   51   5   10   16   29   37   39   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   2    2   1    1    1    1    1    1   0   0   0   0   0   0   0   0   0   0   0   0
```

```
JCB NUMBER   32
         JCB NAME=   AIC
         START TIME=  27
         NBR OF PERS=  2
         CCNFIG NBR= 38
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   P L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 1 1 0 0   0 0 0 0    0 0 0 0 0 0     0 0 1 0 0 0     0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE    2   51    5   10   16   29   37   39    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    2    2    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER   33
         JCB NAME=   JITF
         START TIME=   7
         NBR OF PERS=  2
         CCNFIG NBR= 11
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   N L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 1 1 1 1   0 0 0 0    0 0 0 0 0 0     0 0 0 1 1 0     0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

CTHER ECUIPMENT

 TYPE    2    5   32   33   44   51   23    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    4    2    1    1    1    2    1    0    0    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER   34
         JCB NAME=   TIMK
         START TIME=   5
         NBR OF PERS=  1
         CCNFIG NBR= 12
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   P L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   1 1 1 0 0 0 0   0 0 0 0    0 0 0 0 0 0     0 0 0 1 0 0     0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE    2    5   14   27   44   51    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    3    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER   35
         JCB NAME=   TIMK
         START TIME=  17
         NBR OF PERS=  1
         CCNFIG NBR= 12
```

```
SPECIFIC EQUIPMENT ASSIGNED

C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY      C&S1 TTY
A B C D E S N    F L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
0 0 0 0 0 0 0    1 1 1 0 0 0 0    0 0 0 0    0 0 0 0 0 0     0 0 0 1 0 0    0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    2   5  14  27  44  51   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    3   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0


JOB NUMBER  36
         JOB NAME=  TIMK
         START TIME=  29
         NBR OF PERS=  1
         CONFIG NBR= 12
SPECIFIC EQUIPMENT ASSIGNED

C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY      C&S1 TTY
A B C D E S N    F L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
0 0 0 0 0 0 0    1 1 1 0 0 0 0    0 0 0 0    0 0 0 0 0 0     0 0 0 1 0 0    0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    2   5  14  27  44  51   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    3   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0


JOB NUMBER  37
         JOB NAME=  NTST
         START TIME=  11
         NBR OF PERS=  2
         CONFIG NBR= 32
SPECIFIC EQUIPMENT ASSIGNED

C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY      C&S1 TTY
A B C D E S N    F L K H P Q R    1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
0 0 0 0 0 0 0    0 0 0 1 1 1 1    0 0 0 0    0 0 0 0 0 0     0 0 0 1 0 0    0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    2   5  14  32  33  37  44  51  45   0   0   0   0   0   0   0   0   0   0   0
 NMBR    4   1   1   1   1   1   1   2   3   0   0   0   0   0   0   0   0   0   0   0


JOB NUMBER  38
         JOB NAME=  NTST
         START TIME=  19
         NBR OF PERS=  2
         CONFIG NBR= 33
SPECIFIC EQUIPMENT ASSIGNED
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```
 C&S2 TYPE A      C&S2 TYPE B       C&S1 A     C&S1 B            C&S2 MTU         C&S1 MTU C&S2 TTY        C&S1 TTY

 A B C D E S N    M L K H F C R     1 7 8 9    2 3 4 5 6 10      A B C G J K      1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 0 0 0 0 1 1 1    0 0 0 1 1 1 1     0 0 0 0    0 0 0 0 0 0       0 0 0 1 1 0      0 0 0 0  0 0 0 0 0 0     0 0 0 0 0 0 0 0
CTHER EQUIPMENT

 TYPE      1      2     5    14    23    32    33    44    51    45     0     0     0     0     0     0     0     0     0     0
 NMBR      3      4     2     1     1     1     1     1     2     3     0     0     0     0     0     0     0     0     0     0


JCB NUMBER   39
          JCB NAME=  NTST
          START TIME=  23
          NBR OF PERS=  2
          CCNFIG NBR= 34
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A      C&S2 TYPE B       C&S1 A     C&S1 B            C&S2 MTU         C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N    M L K H P Q R     1 7 8 9    2 3 4 5 6 10      A B C G J K      1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 C 0 C 0 C 0 C    C 0 0 1 1 1 1     0 0 0 0    0 0 0 0 0 0       0 0 0 1 1 0      0 0 0 0  0 0 0 0 0 0     0 0 0 0 C 0 0 0
CTHER ECLIPMENT

 TYPE      2      5    14    23    27    32    44    51    45     0     0     0     0     0     0     0     0     0     0     0
 NMBR      4      2     1     1     5     1     1     1     3     0     0     0     0     0     0     0     0     0     0     0


JCB NUMBER   40
          JCB NAME=  NTST
          START TIME=  25
          NBR OF PERS=  2
          CCNFIG NBR= 35
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A      C&S2 TYPE B       C&S1 A     C&S1 B            C&S2 MTU         C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N    M L K H P Q R     1 7 8 9    2 3 4 5 6 10      A B C G J K      1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 0 0 0 0 0 0 C    C 0 0 0 0 0 0     0 1 1 1    0 0 0 0 0 0       0 0 0 0 0 0      1 0 0 0  0 0 0 0 0 0     0 0 0 0 0 0 0 C
CTHER ECUIPMENT

 TYPE      3      5    19    23    37    51    46     0     0     0     0     0     0     0     0     0     0     0     0     0
 NMBR      3      1     1     1     1     1     4     0     0     0     0     0     0     0     0     0     0     0     0     0


JCB NUMBER   41
          JCB NAME=  NTST
          START TIME=  33
          NBR OF PERS=  2
          CCNFIG NBR= 36
SPECIFIC ECLIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B       C&S1 A     C&S1 B            C&S2 MTU         C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N    M L K H P Q R     1 7 8 9    2 3 4 5 6 10      A B C G J K      1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 0 0 0 0 C 0 0    0 0 0 1 1 1 1     0 1 1 1    0 0 0 0 0 0       0 0 0 1 1 0      0 0 0 0  0 0 0 0 0 0     0 0 0 0 0 0 0 0
```

```
JOB NUMBER  48
        JOB NAME=  HEPL
        START TIME=  11
        NBR OF PERS=  1
        CONFIG NBR= 19
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9    2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0    0 0 0 0 0 0 0    0 1 1 0    1 1 0 0 0 0    0 0 0 0 0 0   0 1 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE   3   4   5  13  34  35  44  51   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   2   2   1   1   1   1   1   2   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER  49
        JOB NAME=  BURR
        START TIME=   6
        NBR OF PERS=  1
        CONFIG NBR= 20
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9    2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0    0 0 0 0 0 0 0    0 0 0 0    0 0 0 1 1 1    0 0 0 0 0 0   0 0 1 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE   4   5  13  37  51  46   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   3   1   1   1   1   4   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER  50
        JOB NAME=  BURR
        START TIME=  12
        NBR OF PERS=  1
        CONFIG NBR= 20
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A      C&S2 TYPE B      C&S1 A     C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N    M L K H P Q R    1 7 8 9    2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0    0 0 0 0 0 0 0    0 0 0 0    0 0 0 1 1 1    0 0 0 0 0 0   0 0 1 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE   4   5  13  37  51  46   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR   3   1   1   1   1   4   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
JCB NUMBER  45
        JOB NAME=  GHAY
        START TIME=  23
        NBR OF PERS=  1
        CCNFIG NBR= 17
SPECIFIC ECLIPMENT ASSIGNED

 C&S2 TYPE A    C&S2 TYPE B    C&S1 A   C&S1 B        C&S2 MTU     C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N  F L K H P Q R  1 7 8 9  2 3 4 5 6 10  A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 C 0 0 0 0 0 C  C 0 0 0 0 0 0  0 0 0 0  0 0 0 1 1 1   0 0 0 0 0 0  0 0 1 0  0 0 0 0 0 0  0 0 0 0 C 0 0 0

CTHER EQUIPMENT

 TYPE  4  5  11  12  44  46  51  0  0  0  0  0  0  0  0  0  0  0  0  0
 NBR   3  1   1   1   1   1   1  0  0  0  0  0  0  0  0  0  0  0  0  0


JCB NUMBER  46
        JCB NAME=  AKST
        START TIME=  5
        NBR CF PERS=  1
        CCNFIG NBR= 16
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A    C&S2 TYPE B    C&S1 A   C&S1 B        C&S2 MTU     C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N  F L K H P Q R  1 7 8 9  2 3 4 5 6 10  A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 C 0 0 C C 0 C  C 0 0 0 0 0 0  0 1 1 1  0 0 0 0 0 0   0 0 0 0 0 0  1 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 C

CTHER EQUIPMENT

 TYPE  3  5  13  27  46  51  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 NBR   3  1   1   1   1   1  0  0  0  0  0  0  0  0  0  0  0  0  0  0


JCB NUMBER  47
        JCB NAME=  AKST
        START TIME=  29
        NBR CF PERS=  1
        CONFIG NBR= 18
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A    C&S2 TYPE B    C&S1 A   C&S1 B        C&S2 MTU     C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N  F L K H P Q R  1 7 8 9  2 3 4 5 6 10  A B C G J K  1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 C 0 C 0 0 0 0  0 0 0 C 0 0 0  0 1 1 1  0 0 0 0 0 0   0 0 0 0 0 0  1 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE  3  5  13  27  46  51  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 NBR   3  1   1   1   1   1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
```

```
JCB NUMBER  54
        JCB NAME=  ASIS
        START TIME=   9
        NBR OF PERS=  1
        CONFIG NBR= 21
SPECIFIC ECUIPMENT ASSIGNED
 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B        C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10  A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0   0 0 1 0 0 0   0 0 0 0 0 0   0 1 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE   4   5   6   7  21  48  50  54  56   0   0   0   0   0   0   0   0   0   0   0
 NMBR   1   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0


JCB NUMBER  55
        JCB NAME=  ASIS
        START TIME=  10
        NBR OF PERS=  1
        CONFIG NBR= 21
SPECIFIC ECUIPMENT ASSIGNED
 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B        C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10  A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0   0 0 1 0 0 0   0 0 0 0 0 0   0 1 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0
CTHER EQUIPMENT

 TYPE   4   5   6   7  21  48  50  54  56   0   0   0   0   0   0   0   0   0   0   0
 NMBR   1   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0


JCB NUMBER  56
        JCB NAME=  ASIS
        START TIME=  15
        NBR OF PERS=  1
        CONFIG NBR= 21
SPECIFIC ECUIPMENT ASSIGNED
 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B        C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10  A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0   0 0 1 0 0 0   0 0 0 0 0 0   0 1 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0
OTHER EQUIPMENT

 TYPE   4   5   6   7  21  48  50  54  56   0   0   0   0   0   0   0   0   0   0   0
 NMBR   1   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0


JCB NUMBER  57
        JCB NAME=  ASIS
        START TIME=  16
        NBR OF PERS=  1
        CONFIG NBR= 21
SPECIFIC ECUIPMENT ASSIGNED
 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B        C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10  A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0   0 0 1 0 0 0   0 0 0 0 0 0   0 1 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0
CTHER EQUIPMENT

 TYPE   4   5   6   7  21  48  50  54  56   0   0   0   0   0   0   0   0   0   0   0
 NMBR   1   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0
```

```
JCB NUMBER  51
         JCB NAME=  BURR
         STAPT TIME=  24
         NBR OF PERS=  1
         CONFIG NBR= 20
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   C 0 0 0 0 0 0    0 0 0 0   0 0 0 1 1 1     0 0 0 0 0 0    0 0 1 0  0 0 0 0 0 0  0 0 0 0 C 0 0 0

CTHER EQUIPMENT

 TYPE    4    5   13   37   51   46    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    3    1    1    1    1    4    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER  52
         JCB NAME=  ASIS
         START TIME=   3
         NBR OF PERS=  1
         CONFIG NBR= 21
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 C   C 0 0 C 0 0 0    0 0 0 0   0 0 1 0 0 0     0 0 0 0 0 0    0 1 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 C

CTHER ECLIPMENT

 TYPE    4    5    6    7   21   48   50   54   56    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    1    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER  53
         JCB NAME=  ASIS
         START TIME=   4
         NBR CF PERS=  1
         CCNFIG NBR= 21
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYFE A     C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 C 0 0 0 0 0 C   C 0 0 0 0 0 0    0 0 0 0   0 0 1 0 0 0     0 0 0 0 0 0    0 1 0 C  0 0 0 C 0 0  0 0 0 0 0 0 0 C

CTHER ECUIPMENT

 TYPE    4    5    6    7   21   48   50   54   56    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    1    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0
```

```
JOB NUMBER  58
          JOB NAME=  ASIS
          START TIME=  21
          NBR OF PERS=  1
          CONFIG NBR= 21
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0    0 0 1 0 0 0     0 0 0 0 0 0     0 1 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    4    5    6    7   21   48   50   54   56    0    0    0    0    0    0    0    0    0    0    0
 NBR     1    1    1    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0

JOB NUMBER  59
          JOB NAME=  LARK
          START TIME=  11
          NBR OF PERS=  1
          CONFIG NBR= 22
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0    0 0 0 0 0 1     0 0 0 0 0 0     0 0 1 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    4    5    6    7    9   21   51    0    0    0    0    0    0    0    0    0    0    0    0    0
 NBR     1    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0

JOB NUMBER  60
          JOB NAME=  LARK
          START TIME=  23
          NBR OF PERS=  1
          CONFIG NBR= 22
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU        C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K     1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0    0 0 1 0 0 0     0 0 0 0 0 0     0 0 0 1  0 0 0 0 0 0   0 0 0 0 0 0 0 0
```

```
OTHER EQUIPMENT

 TYPE    4    5    6    7    9   21   51    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER  61
           JOB NAME=  STCK
           START TIME=  12
           NBR OF PERS=  1
           CONFIG NBR= 23
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B         C&S2 MTU       C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9    2 3 4 5 6 10   A B C G J K    1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0    1 1 0 0 0 0    0 0 0 0 0 0    1 1 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    4    5   19   51   46    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    2    2    1    2    4    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER  62
           JOB NAME=  ERSK
           START TIME=   8
           NBR OF PERS=  1
           CONFIG NBR= 24
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B         C&S2 MTU       C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9    2 3 4 5 6 10   A B C G J K    1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0    0 0 0 1 1 1    0 0 0 0 0 0    0 0 1 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    4    5   13   51   46   26    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    3    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER  63
           JOB NAME=  FALL
           START TIME=  17
           NBR OF PERS=  1
           CONFIG NBR= 25
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B         C&S2 MTU       C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9    2 3 4 5 6 10   A B C G J K    1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0    0 0 0 0 0 1    0 0 0 0 0 0    0 0 1 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    4    5    7   13   51   23    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    1    1    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0
```

```
JCB NUMBER  64
          JCB NAME=  MAXW
          START TIME=   6
          NBR OF PERS=  1
          CCNFIG NBR= 26
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 C 0 C 0 C 0 C   C 0 C C 0 0 0   0 0 0 0    1 1 1 3 3 0     0 0 0 0 0 0    0 1 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 C

CTHER ECUIPMENT

 TYPE    4    5   10   44   46   51    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    3    1    1    1    2    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0

JCB NUMBER  65
          JCB NAME=  CD72
          START TIME=  17
          NBR OF PERS=  1
          CCNFIG NBR= 27
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 C 0 C   C 0 0 0 1 0 0   0 0 0 0    0 0 0 0 0 0     0 0 0 0 1 0    0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

CTHER ECUIPMENT

 TYPE    2    5    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0

JCB NUMBER  66
          JCB NAME=  SAIL
          START TIME=  19
          NBR OF PERS=  1
          CCNFIG NBR= 28
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 C C C 0 0   C 0 0 0 0 0 1   0 0 0 0    0 0 0 0 0 0     0 0 0 1 0 0    0 0 0 0  0 0 0 C 0 0  0 0 0 0 C 0 0 C

CTHER EQUIPMENT

 TYPE    2    5    6   14   51   53    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    1    1    1    2    0    0    0    0    0    0    0    0    0    0    0    0    0    0
```

```
JCB NUMBER  67
        JCB NAME=  SAIL
        START TIME=  30
        NBR OF PERS=  1
        CCNFIG NBR= 28
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 C 0 0   0 0 0 C 0 0 1   0 0 0 0    0 0 0 0 0 0     0 0 0 1 0 0   0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 C

CTHER EQUIPMENT

 TYPE    2    5    6   14   51   53    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    1    1    1    2    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER  68
        JCB NAME=   BPC
        START TIME=   5
        NBR OF PERS=  1
        CCNFIG NBR= 29
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 1 0 C 0 0 0 C   0 0 0 C 0 0 0   0 0 0 0    0 0 0 0 0 0     1 0 0 0 0 0   0 0 0 0  0 0 0 C 0 0  0 0 C 0 0 0 0 C

CTHER EQUIPMENT

 TYPE    1    5    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JCB NUMBER  69
        JCB NAME=   BPC
        START TIME=  11
        NBR OF PERS=  1
        CCNFIG NBR= 29
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A     C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R   1 7 8 9    2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 1 0 0 0 0 C C   C 0 0 0 0 0 0   0 0 0 0    0 0 0 0 0 0     1 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE    1    5    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
```

```
JOB NUMBER   70
        JOB NAME=    BPC
        START TIME=   17
        NBR OF PERS=  1
        CONFIG NBR= 29
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R    1 7 8 9    2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0   0 0 0 0 0 0 0    0 0 0 0    0 0 0 0 0 0    1 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1   5   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER   71
        JOB NAME=    BPC
        START TIME=   25
        NBR OF PERS=  1
        CONFIG NBR= 29
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R    1 7 8 9    2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0   0 0 0 0 0 0 0    0 0 0 0    0 0 0 0 0 0    1 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1   5   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER   72
        JOB NAME=    BPC
        START TIME=   29
        NBR OF PERS=  1
        CONFIG NBR= 29
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   P L K H P Q R    1 7 8 9    2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0   0 0 0 0 0 0 0    0 0 0 0    0 0 0 0 0 0    1 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1   5   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
JOB NUMBER  73
          JOB NAME=   BPC
          START TIME=  33
          NBR OF PERS=  1
          CONFIG NBR= 29
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A       C&S2 TYPE B      C&S1 A      C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N     M L K H P Q R    1 7 8 9     2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0     0 0 0 0 0 0 0    0 0 0 0     0 0 0 0 0 0     1 0 0 0 0 0    0 0 0 0  0 0 0 0 0 0     0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1    5    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER  74
          JOB NAME=   BPC
          START TIME=  35
          NBR OF PERS=  1
          CONFIG NBR= 29
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A       C&S2 TYPE B      C&S1 A      C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N     M L K H P Q R    1 7 8 9     2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0     0 0 0 0 0 0 0    0 0 0 0     0 0 0 0 0 0     1 0 0 0 0 0    0 0 0 0  0 0 0 0 0 0     0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1    5    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER  75
          JOB NAME=   BPC
          START TIME=  39
          NBR OF PERS=  1
          CONFIG NBR= 29
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A       C&S2 TYPE B      C&S1 A      C&S1 B          C&S2 MTU       C&S1 MTU C&S2 TTY        C&S1 TTY
 A B C D E S N     M L K H P Q R    1 7 8 9     2 3 4 5 6 10    A B C G J K    1 2 5 6  A C D E H P     1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0     0 0 0 0 0 0 0    0 0 0 0     0 0 0 0 0 0     1 0 0 0 0 0    0 0 0 0  0 0 0 0 0 0     0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1    5    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
 NMBR    1    1    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0


JOB NUMBER  76
          JOB NAME=   BPC
          START TIME=  41
          NBR OF PERS=  1
          CONFIG NBR= 29
```

```
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 1 0 0 0 0 0 0   0 0 0 0 0 0 0   0 0 0 0   0 0 0 0 0 0    1 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    1   5   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER   77
          JOB NAME=  HALL
          START TIME=   5
          NBR OF PERS=  2
          CONFIG NBR= 30
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 1   0 0 0 0   0 0 0 0 0 0    0 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    2   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER   78
          JOB NAME=  HALL
          START TIME=  11
          NBR OF PERS=  2
          CONFIG NBR= 30
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 1 0 0 0 0   0 0 0 0   0 0 0 0 0 0    0 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    2   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER   79
          JOB NAME=  HALL
          START TIME=  14
          NBR OF PERS=  2
          CONFIG NBR= 30
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY

 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 0 1   0 0 0 0   0 0 0 0 0 0    0 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

 TYPE    2   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
JCB NUMBER  80
          JCB NAME=  HALL
          START TIME=  23
          NBR CF PERS=  2
          CCNFIG NBR= 30
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A    C&S2 TYPE B     C&S1 A    C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N  M L K H P Q R   1 7 8 9   2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0  0 0 1 0 0 0 0   0 0 0 0   0 0 0 0 0 0     0 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE    2   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JCB NUMBER  81
          JCB NAME=  HALL
          START TIME=  26
          NBR CF PERS=  2
          CCNFIG NBR= 30
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A    C&S2 TYPE B     C&S1 A    C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N  M L K H P Q R   1 7 8 9   2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0  0 0 0 0 0 3 1   0 0 0 0   0 0 0 0 0 0     0 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE    2   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JCB NUMBER  82
          JCB NAME=  MPCS
          START TIME=   3
          NBR OF PERS=  2
          CCNFIG NBR= 31
SPECIFIC ECUIPMENT ASSIGNED

 C&S2 TYPE A    C&S2 TYPE B     C&S1 A    C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N  M L K H P Q R   1 7 8 9   2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0  0 0 0 0 0 1 1   0 0 0 0   0 0 0 0 0 0     0 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0
```

```
OTHER EQUIPMENT

 TYPE    2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 NMBR    2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0


JOB NUMBER   83
          JOB NAME=  MPCS
          START TIME=    9
          NBR OF PERS=   2
          CONFIG NBR= 31
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 1 1   0 0 0 0   0 0 0 0 0 0    0 0 0 0 0 0    0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0
OTHER EQUIPMENT

 TYPE    2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 NMBR    2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0


JOB NUMBER   84
          JOB NAME=  MPCS
          START TIME=   16
          NBR OF PERS=   2
          CONFIG NBR= 31
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 1 1   0 0 0 0   0 0 0 0 0 0    0 0 0 0 0 0    0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0
OTHER EQUIPMENT

 TYPE    2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 NMBR    2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0


JOB NUMBER   85
          JOB NAME=  MPCS
          START TIME=   21
          NBR OF PERS=   2
          CONFIG NBR= 31
SPECIFIC EQUIPMENT ASSIGNED

 C&S2 TYPE A     C&S2 TYPE B     C&S1 A    C&S1 B         C&S2 MTU       C&S1 MTU C&S2 TTY     C&S1 TTY
 A B C D E S N   M L K H P Q R   1 7 8 9   2 3 4 5 6 10   A B C G J K    1 2 5 6  A C D E H P  1 2 3 4 5 6 7 8
 0 0 0 0 0 0 0   0 0 0 0 0 1 1   0 0 0 0   0 0 0 0 0 0    0 0 0 0 0 0    0 0 0 0  0 0 0 0 0 0  0 0 0 0 0 0 0 0
OTHER EQUIPMENT

 TYPE    2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
 NMBR    2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
```

```
JOB NUMBER  86
          JOB NAME=  MPCS
          START TIME=  28
          NBR OF PERS=  2
          CONFIG NBR= 31
SPECIFIC EQUIPMENT ASSIGNED

C&S2 TYPE A      C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
A B C D E S N    P L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
0 0 0 0 0 0 0    0 0 0 0 0 1 1    0 0 0 0   0 0 0 0 0 0     0 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

TYPE   2   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
NMBR   2   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER  87
          JOB NAME=  BURK
          START TIME=   3
          NBR OF PERS=  1
          CONFIG NBR= 13
SPECIFIC EQUIPMENT ASSIGNED

C&S2 TYPE A      C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
A B C D E S N    P L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
0 0 0 0 0 0 0    0 0 0 0 0 0 0    1 0 0 0   0 0 0 0 0 0     0 0 0 0 0 0   0 0 0 1  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

TYPE   3   5  13  20  30   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
NMBR   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0

JOB NUMBER  88
          JOB NAME=  BURK
          START TIME=   9
          NBR OF PERS=  1
          CONFIG NBR= 13
SPECIFIC EQUIPMENT ASSIGNED

C&S2 TYPE A      C&S2 TYPE B      C&S1 A    C&S1 B          C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
A B C D E S N    P L K H P Q R    1 7 8 9   2 3 4 5 6 10    A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
0 0 0 0 0 0 0    0 0 0 0 0 0 0    1 0 0 0   0 0 0 0 0 0     0 0 0 0 0 0   0 0 0 1  0 0 0 0 0 0   0 0 0 0 0 0 0 0

OTHER EQUIPMENT

TYPE   3   5  13  20  30   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
NMBR   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

```
JCB NUMBER  89
        JCB NAME=  BURK
        START TIME=  14
        NBR OF PERS=  2
        CCNFIG NBR= 13
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B           C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9    2 3 4 5 6 10     A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 0 0 C   0 0 0 9 0 0 C    1 0 0 0    0 0 0 0 0 0      0 0 0 0 0 0   1 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 0

CTHER EQUIPMENT

 TYPE    3   5  13  20  30   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0


JCB NUMBER  90
        NOT SCHECULEC  ********************
        JCB NAME=  BURK
        START TIME=  0
        NBR OF PERS=  0
        CCNFIG NBR= 13
SPECIFIC ECLIPMENT ASSIGNEC

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B           C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9    2 3 4 5 6 10     A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 0 0 C 0 C   C 0 0 0 C 0 0    0 0 0 0    0 0 0 0 0 C      0 0 0 0 0 0   0 0 0 0  0 0 0 0 0 0   0 0 0 0 0 0 0 C

CTHER EQUIPMENT

 TYPE    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0


JCB NUMBER  91
        JCB NAME=  NACR
        START TIME=  17
        NBR OF PERS=  1
        CONFIG NBR= 14
SPECIFIC ECUIPMENT ASSIGNEC

 C&S2 TYPE A     C&S2 TYPE B      C&S1 A     C&S1 B           C&S2 MTU      C&S1 MTU C&S2 TTY      C&S1 TTY
 A B C D E S N   M L K H P Q R    1 7 8 9    2 3 4 5 6 10     A B C G J K   1 2 5 6  A C D E H P   1 2 3 4 5 6 7 8
 0 0 C 0 C 0 C   C C 0 0 0 0 0    0 1 1 0    0 0 0 0 0 0      0 0 0 0 0 0   1 0 0 0  0 0 0 C 0 0   0 0 0 0 0 0 0 C

CTHER EQUIPMENT

 TYPE    3   5  10  51  23   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
 NMBR    2   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

**** JOBS NOT SCHEDULED **** 25 26 27 90

EQUIPMENT AVAILABLE FOR EACH TIME PERIOD

TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
TIME 1	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME 2	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME 3	3	0	1	0	3	1	3	1	0	0	0	0	0	0	1	0	1	1	0	0	0	1	6	1	1	2	0	0	5	0	1	1	0	1	1	1	0	1	0	1	1	1	0	3	7	9	3	2	1	0	3	1	6	0	13	0
TIME 4	3	0	2	0	4	1	3	1	0	0	0	0	1	0	1	0	1	1	0	1	0	1	6	1	1	2	0	0	5	1	1	1	0	1	1	1	0	1	0	1	1	1	0	3	7	9	3	2	1	0	3	1	6	0	13	0
TIME 5	6	3	1	0	4	2	3	1	1	1	0	0	0	0	1	1	1	0	0	1	1	1	6	0	1	4	3	2	6	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	7	7	5	3	1	1	1	1	6	1	14	1
TIME 6	7	6	4	0	8	2	4	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	7	9	5	3	1	1	3	1	6	1	14	1
TIME 7	7	3	0	0	8	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1	1	5	5	2	7	1	1	0	0	1	1	1	2	1	1	1	1	1	1	3	7	9	5	3	1	1	3	1	6	1	14	1
TIME 8	7	3	4	3	7	2	4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	5	1	1	4	5	2	7	1	1	0	0	1	1	1	2	1	1	1	1	1	1	3	7	8	5	3	1	1	2	1	6	1	14	1
TIME 9	3	0	1	0	3	1	3	1	0	0	0	0	0	0	1	0	1	1	0	0	0	1	6	1	1	2	0	0	5	0	1	1	0	1	1	1	0	1	0	1	1	1	0	3	7	9	3	2	1	0	3	1	6	0	13	0
TIME10	3	0	2	0	4	1	3	1	0	0	0	0	1	0	1	0	1	1	0	1	0	1	6	1	1	2	0	0	5	1	1	1	0	1	1	1	0	1	0	1	1	1	0	3	7	9	3	2	1	0	3	1	6	0	13	0
TIME11	6	2	2	3	6	1	3	1	0	1	1	1	0	0	1	1	1	1	1	1	0	1	6	1	1	5	5	2	7	1	1	0	0	0	0	1	0	1	1	1	1	1	1	2	4	9	5	3	1	1	0	1	6	1	14	1
TIME12	7	2	4	1	6	2	4	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	6	1	1	5	5	2	7	1	1	0	0	1	1	1	0	1	1	1	1	1	1	3	4	1	5	3	1	1	0	1	6	1	14	1
TIME13	7	0	4	6	10	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME14	7	6	3	6	9	2	4	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	6	1	1	5	5	2	7	0	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME15	3	1	3	0	4	1	3	1	0	0	0	0	0	0	1	0	1	1	1	0	0	1	6	1	1	2	0	0	6	0	1	1	0	1	1	1	1	1	0	1	1	1	1	4	7	9	3	2	1	0	3	1	6	0	13	0
TIME16	3	0	1	0	3	1	3	1	0	0	0	0	0	0	1	0	1	1	1	0	0	1	6	1	1	2	0	0	6	0	0	0	0	1	1	1	1	1	0	1	1	1	1	4	7	9	3	2	1	0	3	1	6	0	11	0
TIME17	6	1	2	5	5	2	3	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	4	1	1	5	4	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	3	7	9	5	3	1	1	2	1	6	1	14	1
TIME18	7	6	4	6	9	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	4	1	6	1	14	1
TIME19	4	3	0	0	8	2	4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	0	0	1	1	1	2	1	1	1	1	1	1	3	4	9	5	3	1	1	3	1	6	1	14	1
TIME20	4	3	4	6	8	2	4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	5	1	1	5	5	2	7	1	1	0	0	1	1	1	2	1	1	0	1	1	1	3	4	9	5	3	1	0	3	1	6	1	14	1
TIME21	3	0	1	0	3	1	3	1	0	0	0	0	0	0	1	0	1	1	1	0	0	1	6	1	1	2	0	0	6	0	0	0	0	1	1	1	1	1	0	1	1	1	1	4	7	9	3	2	1	0	3	1	6	0	11	0
TIME22	3	0	1	1	4	2	4	1	0	0	0	0	0	0	1	0	1	1	1	1	1	1	6	1	1	2	0	0	6	0	0	0	0	1	1	1	1	1	0	1	1	1	1	4	7	9	3	2	1	0	3	1	6	1	11	1
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TIME26	7	6	1	6	9	2	4	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	5	1	1	5	5	2	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	7	5	5	3	1	1	4	1	6	1	14	1
TIME27	3	0	1	0	4	2	4	1	0	0	0	0	0	0	1	0	1	1	1	1	1	1	6	1	1	2	0	0	6	0	0	0	0	1	1	1	1	1	0	1	1	1	1	4	7	9	3	3	1	1	3	1	6	1	11	1
TIME28	3	0	1	1	4	2	4	1	0	0	0	0	0	0	1	0	1	1	1	1	1	1	6	1	1	2	0	0	6	0	0	0	0	1	1	1	1	1	0	1	1	1	1	4	7	9	3	3	1	1	3	1	6	1	11	1
TIME29	6	2	0	6	7	2	4	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	0	3	7	8	5	3	1	1	3	1	6	1	14	1
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TIME31	7	7	4	6	10	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME32	7	7	4	6	10	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME33	6	7	1	6	7	2	4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	6	1	1	5	0	2	7	1	1	0	0	1	1	1	2	1	1	1	1	1	1	3	4	9	5	3	1	1	3	1	6	1	14	1
TIME34	7	3	1	6	8	2	4	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	0	0	1	1	1	2	1	1	1	1	1	1	3	4	9	5	3	1	1	3	1	6	1	14	1
TIME35	6	7	4	6	9	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME36	7	7	4	6	10	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME37	7	7	4	6	10	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME38	7	7	4	6	10	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME39	6	7	4	6	9	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME40	7	7	4	6	10	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME41	6	7	4	6	9	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1
TIME42	7	7	4	6	10	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	1	5	5	2	7	1	1	1	1	1	1	1	2	1	1	1	1	1	1	4	7	9	5	3	1	1	5	1	6	1	14	1

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